PLANT INDUSTRY DIVISION

Annual Report

June, 1985

Alberta
AGRICULTURE

INTRODUCTION

The Plant Industry Division of Alberta Agriculture is comprised of five branches: Field Crops, Crop Protection, Soils, Tree Nursery and Horticulture, and Horticultural Research. Two branches, namely Crop Protection and Soils, are located at the Department's headquarters in Edmonton. The Field Crops branch is located at Lacombe, the Tree Nursery and Horticulture Centre at Oliver, and the Horticultural Research Center at Brooks.

The Division's main objective is to provide a service in plant and related sciences to the agricultural industry that will be conducive to greater economic and aesthetic returns to those engaged in agriculture. In its broad concept, this service should be compatible with the concept and philosophy of environmental concern and resources conservation. The activities of the five branches are geared towards the overall attainment of these objectives.

This annual report provides some detailed information about the programs carried out by the branches of the Plant Industry Division and about their achievements during the year 1984/85.

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I. PROGRAM OBJECTIVES

A number of programs are carried out by the five branches of the Plant Industry Division. These programs are co-ordinated by the Division's director and his staff. The director's main responsibilities are to provide an overview of policy making in agriculture generally and in the area of plant production in particular. He is also responsible for reviewing the programs of his division and for assessing their compatibility with needs of the industry and with government policy.

The following is a brief summary of the objectives of the various programs carried out by the division's branches.

A. FIELD CROPS BRANCH

The objectives of this branch are:

- To develop new, high-yielding varieties of barley, winter wheat, winter and spring triticale adaptable to Alberta.

- To obtain performance and adaptability information on new and recommended cultivars of barley, wheat, oats, canola and flax.

- To evaluate varieties and agronomic practices of barley, wheat and triticale for high moisture grain production.

- To promote adoption of varieties and management practices to improve cereal and oilseed production in Alberta.

- To provide seed technology to improve pedigreed seed production.

- To promote adoption of forage varieties and management practices on rangeland and tame forage crops to improve forage production in Alberta.

- To study the economic and agronomic advantages of special (alternate) crops in Alberta and to obtain performance and adaptability information on possible alternate crops, in order to make variety and production recommendations. To develop the agronomic technology necessary to produce viable seed from alternate crops.

- To administer the guidelines for assistance to the Municipal Co-op Seed Cleaning Plants in Alberta.

- To provide assistance to other sectors of the Department, agencies, and the agricultural industry.

B. CROP PROTECTION BRANCH

The objectives of this branch are:

- To maintain a high level of technical competence in Alberta, in the disciplines which we serve.

- To decrease the damage done to crops by pests of all kinds through operation of appropriate programs.

- To advance the state of the art and science of pest control by ongoing research and development programs.

- To protect landowners from the ravages of weeds, disease, insects, etc., which may be caused by the actions or inattention of others, through the wise and judicious use of enforcement programs.

C. SOILS BRANCH

The objectives of this branch are:

- To increase agricultural production and improve farm incomes by providing the farming public with information and laboratory services related to soil management, soil amendments, and fertilizer use and by establishing applied research projects to solve soil problems involving fertility, acidity and soil structure.

- To encourage the wise and proper use and management of the agricultural soil resources of Alberta through education, and applied research.

- To provide technical expertise and diagnostic capability related to soils, plants and animal feeds for the agricultural industry.

D. ALBERTA TREE NURSERY AND HORTICULTURE CENTRE

The objectives of this Centre are:

- To provide rural Albertans with trees and shrubs suitable for farm shelterbelts and field windbreaks. To provide information on the design and care of shelterbelts.

- To provide extension services to the nursery trades (including turf managers) and backyard gardeners across the province; and to greenhouse growers and vegetable producers in the northern half of the province.

- To co-ordinate the department's research efforts in woody ornamentals.

- To provide applied research in nursery, greenhouse and vegetable production.

- To provide assistance to the horticultural industry, other sectors of the department, other government agencies, municipal government agencies, and post secondary institutions.

E. ALBERTA HORTICULTURAL RESEARCH CENTER

The objectives of this Centre are:

- To provide applied research and development expertise and extension information to all parts of the horticultural industry in the province, and to provide horticultural and special crops advice to commercial growers, amateur horticulturists, and to staff within Alberta Agriculture.

- To provide applied research and extension services in new and specialty crops grown under irrigation.

- To provide plant diagnostic and extension service to the southern part of Alberta through the Regional Crops Laboratory at Brooks.

- To administer the Alberta Vegetable Sales Act, urban and amateur horticultural programs and special projects.

- To provide assistance to other sectors of the department, to other government agencies and the horticultural industries.

II. PROGRAM SUMMARIES

The programs carried out by the five branches of the Plant Industry Division to achieve their objectives are summarized in this section. A more elaborate discussion of each program can be found in Section III.

A. FIELD CROPS BRANCH

There was a heavy demand this year for information on barley, winter wheat, H.R.S. wheat, semi-dwarf wheat, and canola.

A "Soft White Wheat Production" manual was prepared and published. A survey was undertaken of S.W.S. wheat producers to gather information and practices, and the technology employed.

The Branch prepared the "Canola Production Manual" for the Canola Council of Canada. 15,000 copies were distributed. A summarized version, "Canola Production in Alberta", was prepared and issued to all extension offices.

The Branch provided professional staff to review rapeseed production in India, and improved range management and forage production in China.

Seventy-seven Municipal Co-op Seed Plants processed 31 million bushels of cereal grain and oilseeds. Average volume per plant was 402,485 bushels. We processed 42 upgrading grants, amounting to $376,393.77 representing the provincial governments participation at 40 per cent. Replacement plants were built at Sexsmith ($950,000) and Vegreville ($1.1 million). Provincial share of these two plants was 40 per cent, approximately $820,000.00.

Grey-Wooded Forage Association established at Rocky Mountain House. Now have nine forage associations in Alberta.

Research Section has developed a new semi-dwarf feed barley. It is named Samson. This is the third variety developed by this 10-year program. Promising material in winter wheat and triticale on test.

Seed technology demand is high, involving pedigreed seed production, seed shows, field days, forage seed project, stock seed distribution, and probationary growers workshops.

Drought conditions will put long-term pressure on Alberta pastures and rangeland. Extension efforts involved forage seminars, with record attendance at all locations. Forage Associations provide excellent extension medium.

Special crop activities geared to demonstration plots and working with associations, organizations and extension staff. Interest is increasing in wild rice, comfrey and Jerusalem artichokes. The alfalfa seed industry is very active. Beans, peas, lentils, confectionery sunflowers, corn and buckwheat are the main crops promoted by this section.

B. CROP PROTECTION BRANCH

The Branch exists to deal with the mitigation, management and control of crop pests in Alberta. This includes weeds, insects, diseases and vertebrate pests. In carrying out our function, the Branch is involved in research, extension, enforcement and direct control activities. The Branch staff is highly technical and very specialized. In general, we serve as the "expert" resource to support the activities of regional and district staff as well as municipal and industry programs. A major Branch function is to provide the necessary resources to local farmers and other personnel who carry on the ongoing struggle with pests.

The Branch is highly involved with training, public speaking, demonstrations, publications and co-ordination of programs.

Additionally, the Apiculture program is located within the Branch.

C. SOILS BRANCH

The Soils Branch of the Plant Industry Division provides province-wide extension, research and diagnostic programs. Soil and feed analysis were provided to farmers on a fee basis and to department staff on a non-fee basis as a diagnostic service and for research. Soil and plant analysis were also provided on a fee basis to other research institutions. Total soil and feed sample analysis decreased 6,500 from last year to 43,204 samples this year. Most of the decrease was in farm samples.

Variation in results and recommendations among laboratories was a major concern. Staff were involved in developing a laboratory accreditation program and an automated (computerized) recommendation system as a means of reducing variability in recommendations from laboratories.

Applied research projects were carried out in the following areas:

- soil test calibration,
- fertilizer rates and placement,
- acid and solonetzic management, and
- diagnosis of specific production problems.

Participation in research project has contributed to:

- revised soil test calibration for potassium,
- a fact sheet -- "Potassium Fertilizer Application in Crop Production", and
- a fact sheet -- "Using Nitrogen Fertilizers Effectively".

The Agricultural Lime Freight Assistance Program provided over $300,000 in freight assistance grants to 81 applicants transporting 11,700 tonnes of lime and marl. This is a decrease from over $600,000 assistance last year. The decrease in the use of this program was caused by the early winter and poor economic conditions.

Fertilizer sales increased by 5.8 percent to 919,108 tonnes. Sales activities of unregistered and unproven products remained high and a concern.

D. ALBERTA TREE NURSERY AND HORTICULTURE CENTRE

The Alberta Tree Nursery and Horticulture Centre is the production and distribution site for the shelterbelt program of Alberta Agriculture. In 1984, 2.5 million plants were shipped to fulfil 8,279 orders.

Spring shipping was completed earlier than average. However, the October snow hampered the fall activities.

In addition to the annual pruning courses, several workshops on shelterbelt design and maintenance were held throughout the province.

Greenhouse production of seedlings increased slightly from last year. All conifers used in the shelterbelt program were started in the greenhouse and later transplanted into the fields.

A total of 11,792 trees and shrubs were shipped to various provincial parks. In 1984, 42,454 seedlings were distributed for Arbor Day programs across the province.

Extension services were provided by the various specialists on staff. The vegetable crop extension specialist provided information on all aspects of production of vegetables and small fruits to growers in central-northern Alberta. The turf specialist was able to assist sod producers and turf managers on cultural practices and production

problems. Information was also provided to backyard gardeners through courses, presentations, media and a telephone service. The number of inquiries increased to 5,800 and the hort hot-line received 2,484 calls. A close liaison was maintained with other agencies providing services to the backyard gardener.

The Alberta Tree Nursery and Horticulture Centre was involved with research activities in nursery production, vegetable production, turf maintenance and cultivar evaluations to vegetables, woody ornamentals and grasses.

E. ALBERTA HORTICULTURAL RESEARCH CENTER

The Alberta Horticultural Research Center (AHRC) is involved in province-wide extension and research activities relating to all areas of horticulture and irrigated speciality crops. On and off-site co-operative research projects are conducted in collaboration with personnel from Agriculture Canada and the University of Alberta, as well as from the Plant Industry Branches and the Irrigation and Conservation Divisions of Alberta Agriculture.

A number of program and staff changes occurred at AHRC in the past year. The greenhouse energy program was eliminated and the associated position was transferred to the center's regional crops laboratory where a permanent diagnostician position was established. The Center's tree fruit research program was downsized, as was the apiculture program. Two permanent positions were eliminated from the Center's staff complement.

The AHRC operational structure was reorganized by replacing the Vegetable and Special Crops Section with three program units: a vegetable and market garden crops unit, a potato unit and a special crops unit. These units and two program sections provide research, development and extension services to specific horticultural and/or commodity sectors. The Environmental Horticulture Section carries

responsibility for research and extension into production of small fruit, bush and native fruit, ornamental and nursery stock and greenhouse vegetable and flower crops. The Vegetable and Special Crops Units provide applied research, demonstration and extension assistance for vegetables, potatoes, corn, as well as a variety of new crops such as beans, forages, grain legumes and herbs and spices. In addition to providing technical support for the commodity based programs the efforts of the Laboratory Services Section are directed toward diagnosis of plant diseases, insect and weed control, crops storage, food processing and product development. Administrative and operational support for the above three programs is provided by the Administrative Services Section and the Farm Operations Section, respectively.

Test sites for the research extension function of AHRC staff are located throughout the province. In addition to the utilization of the three farms at Brooks, research/demonstration plots are found in locations such as Bow Island, Edmonton, Standard and the Peace River region.

The extension activities of AHRC personnel support and complement extension services provided by the other Alberta Agriculture staff centered in regional and district offices. Contact with both commercial and amateur horticulture clients is assured by maintaining a close working relationship with the industry, input into advisory committee recommendations, and involvement with grower groups and associations. Staff regularly conduct, teach and participate in numerous short courses and seminars held throughout the province. To ensure rapid exchange of information between the producer and the researcher, staff host commodity oriented field days at AHRC and participate in similar field days held elsewhere. Membership and active involvement in commodity advisory groups, Agriculture Canada expert committees, and industry-based committees permit the dissemination of applied research information to all sectors of the horticulture industry.

III. PROGRAM ACTIVITIES

A detailed discussion of the activities undertaken by the branches to carry out their programs is presented in this section.

A. FIELD CROPS BRANCH

a) CEREAL CROPS

The publication 'Varieties of Cereal and Oilseed Crops for Alberta' was revised, updated and distributed through the "Country Guide" and District Offices. The information presented in this publication is based upon our extensive regional variety testing program to aid farmers in selecting the most suited varieties for their areas.

A manual entitled "Soft White Wheat Production" was prepared and published. The manual incorporates research information with the practices of top producers as revealed through survey results into a complete production package for irrigated soft white wheat.

The major extension demand this year was on barley, winter wheat, hard red spring wheat and semi-dwarf wheat production.

Seventy-seven municipal co-operative seed cleaning plants processed 31 million bushels of cereal grain and oilseeds for the year ending June 30, 1984. This amount was up 2.1 million bushels from last year, but 0.1 million bushels below the previous all-time high. The following table shows the amount of seed processed in 1984.

General Summary (Bushels)	1984
Total cleaned for Commercial seed	24,356,602
Total cleaned for Pedigreed seed	1,527,104
Total cleaned for SEED	25,883,706
Total cleaned for Dockage Removal	5,107,659
TOTAL PROCESSED	30,991,365
Average grain processed per plant	402,485

The Seed Cleaning Plant Upgrading Program grant applications were two less than last year. Forty-two applications were processed, totalling $992,435.30 of expenditures by the plants, and $578,140.47 of provincial grant money, $376,393.77 for the 42 applications of 84/85 fiscal year, and $229,858.33 to pay last year's shortfall. This compares to 44 grant applications totalling $1,546,774.59 of expenditure and $668,592.58 of provincial grant money last year. The average grant paid in 1984 was $8,961.76 compared to $15,195.29 paid last year.

Two new Co-op Seed Cleaning Plants were completed in 1984-85, one plant at Vegreville costing about $1.1 million, and a plant at Sexsmith costing about $950,000. Three plants are in various stages of replacement in 1985-86 in Stony Plain, Carstairs and Vermilion. Future plants planning on a replacement plant are Dawson Creek in 1986-87, Willingdon in 1987-88, Rycroft in 1988-89 and Three Hills in 1989-90. Our Provincial Replacement Program provides technical and financial assistance to these plants, each of which will cost about $1,000,000.00.

b) OILSEED CROPS

Canola acreage in 1984 increased considerably to 2.9 million acres from 2.5 million acres in 1983, and 1.85 million in 1982.

Principal activities were directed towards technology transfer through media releases, training sessions with crusher and other industry field representatives, field tours, media presentations, production meetings and individual contacts. Three 2-day in-service canola technology seminars were held for field services staff and industry. Numerous articles and materials were prepared and assembled for regional and district staff, educational institutes and commodity groups.

The "Canola Growers Manual" was written for the Canola Council of Canada as part of their "Grow with Canola" technology transfer program. Over 15,000 copies were sold and distributed to farmers throughout

Canada. A summarized version of the manual "Canola Production in Alberta" was prepared and released in Alberta. This publication included the highlights from the latest technology combined with canola production survey results.

Close liaison was maintained with oilseed organizations, crushers and exporters to facilitate communications within the oilseed complex and provide resource information. Two Alberta Canola Industry meetings were held to discuss the common concerns of the canola industry by crushers, grain handlers, producers, seed growers and government. A Flax Council of Canada was founded through the Flax Growers of Western Canada and flax industries.

Close liaison was maintained with Agriculture Canada regarding the Canada/Alberta Canola Breeding Project at Beaverlodge, Lethbridge and Saskatoon. This project continues to develop progressively toward regionally suitable varieties for northern Alberta and for southern Alberta irrigation and dryland.

c) SEED TECHNOLOGY

The Alberta Branch of the Canadian Seed Growers' Association experienced a successful year. Membership remained strong at about 1,100, but acres inspected rose to 214,000, which is the highest in history.

Agriculture Canada, under the new government, is going to a cost recovery format. The increase in fees proposed, to be incurred by the seed industry, were quite alarming. After considerable discussion, the cost for acreage inspection will rise by 25¢ in 1985. Costs for seed testing, seed sealing and other areas are still in the negotiating stages. The indications are that there will be substantial increases over the next couple of years.

The Alberta Stock Seed Distribution Committee handled 99 applications in 1985. This was almost a 100 per cent increase from 1984. Fifty-four of these applicants were granted probationary status.

SeCan Association membership remained solid at 2,500 members. SeCan varieties accounted for about 56 per cent of the inspected acres in 1984. Two successful regional meetings were held in 1985. Peace River hosted the February 28 meeting, and Red Deer was the site of the March 1 meeting. Both meetings were well attended and well received.

The second annual Pedigreed Seed Show held in Edmonton had 250 entries in 1985. This was up 50 from 1984, which was well received considering the hardships which were experienced by the various areas of the province. Ag-Expo, in Lethbridge, held its first international seed show which was successful for the first year with 50 samples from around the world. The seed show at Round-Up held its final year as a fall show. Calgary is looking at a spring show. The pedigreed seed display was at these major fairs, as well as various smaller fairs. Assistance was provided to people entering samples in the Royal Winter Fair in Toronto. The Alberta Branch of the Canadian Seed Growers' Association again hosted the Probationary/Select Workshop in Lacombe, as well as various field days.

The Seed Technology Workshop held at Olds College was again well received. The various representatives of the seed industry were very supportive of this event.

The Alberta Branch of the Canadian Seed Growers' Association maintained liaison with the respective commodity groups and associations. Red Deer was the site of the 1985 Annual Meeting, which attracted 180 members and guests. The Alberta Branch also participated in the National Canadian Seed Growers' Association Convention and Canadian Seed Growers' Association-Canadian Seed Trade Association Interprovincial Meetings.

The Canadian Forage Seed Project handled 48 applications for 5,100 kg of Foundation seed. Seed was distributed as requested. In

addition, 1,533.5 kg of Foundation seed was demoted to Certified and allocated to the respective successful tender. The Project saw Chief intermediate wheatgrass, Magna bromegrass, Norlac red clover, Basho timothy, and Trek alfalfa go to the SeCan Association.

Assistance was provided to all regional and district staff as requested. This assistance was also made available to commodity groups, associations, Agriculture Canada, universities, colleges and the farming public.

d) FORAGES AND SPECIAL CROPS

i) Forages

The Forage Section continued the improved extension program, with emphasis on pasture management and pasture improvement, by working through eight forage associations. The forage associations continue to have strong local programs, especially doing pasture management and demonstrations, and publishing their results in their association papers. Attendance at forage seminars was especially high in 1984-85.

The Alberta Forage Institute became more active and their programs included a series of four pasture seminars at Grande Prairie, Westlock, Vermilion and Olds. Registered attendance at these seminars was approximately 700 people.

Drought conditions from central to southern Alberta was devastating to hay and pasture production, resulting in over-grazed ranges and severe hay shortages. To make matters worse, cereal crop production was below normal, resulting in a short supply of supplement straw for feed. Early snowfall and winter made the feeding period exceptionally long. Hay was hauled from as far north as the Peace River to meet southern Alberta requirements. Cattle herds were culled to available feed supply, and suspect further sell off of yearlings in the spring of 1985 to ease the pressure on poor pastures.

The effect of the drought on native range will be seen for many years, even with reduced cattle numbers and normal precipitation.

The Forage Section has and will continue to monitor the pasture and hay conditions in 1985. Encouragement of the use of annuals for supplement feed and emergency pasture and hay will continue.

The Forage Section continued to develop a pasture project with Alberta assisting the sister province of Heilongjiang, China. Objective of the project is to demonstrate proper pasture management and pasture renovation in China to increase their beef and dairy industry.

Continued efforts to develop methods for preservation of high moisture hay was emphasized, and further trials will be developed for areas of high rainfall.

Forage seed supplies and prices varied from crop to crop. Creeping red fescue seed production was high with low prices. Bromegrass seed crop was low due to poor yield and prices remained relatively high. Alfalfa acreage was large, with average yield and fair prices, slightly lower than last year. Alfalfa seed crop has more than tripled in size since 1979-80. Red clover seed production was average although much of the seed was not harvested in the fall of 1984 because of early snowfall. Prices were only fair. Alsike and sweet clover yields and prices remained about average.

Measuring of forage production on pastures has been a long and costly procedure. This Section has developed a forage meter which will, hopefully, make forage measurements more accurate, faster and less costly. Alberta Hail and Crop Insurance Corporation and the forage associations will put this meter into practice in 1985.

Liaison with the dehy industry, seed trade, universities, and Agriculture Canada was maintained to promote and develop the forage industry. Forage Seed Council received a new mandate to assist the industry and promote forage seed sales. The Forage Section has an active representation on this Council.

Emphasis on forage production with assistance to Regional Specialists has continued to develop better extension techniques for expansion of the forage industry. The Forage Institute and forage associations continue to be the best extension tool to improve forage production and utilization.

Numerous press, radio and pamphlet releases were prepared, with emphasis on emergency livestock feed under drought conditions having a priority.

ii) Special Crops

The Special Crops Section initiated and assisted in the promotion of special crops programs for Alberta farmers. More producers are looking for alternative crops to cereal and oilseeds, especially in years of good markets. Producers are also looking to pulse crops in a rotation for improvement of soils.

Special crop development was developed by co-operation in extension programs with regional and district staff, educational institutions and agri-business, by initiating research programs, and by development of demonstration plot work in the province.

The market potential for canola and wheat last year prevented a large expansion in special crop acreage, but acreage remained almost the same as 1983. Interest in pulse crops increased and was reflected by an increase in dry peas and bean acreage. Fababean acreage remained the same, but better harvesting techniques will increase this acreage. Lentil acreage was down from 1983. Grain corn, confectionery sunflowers and buckwheat remained about the same.

This Section was involved in assisting various associations and organizations in developing projects with wild rice, comfrey and Jerusalem artichokes. This Section continues to assist the alfalfa seed producers and leafcutter bee industry to improve and expand this industry.

e) CROPS RESEARCH

The 1984 growing season was extremely dry and hot, whereas the harvest period was wet and cool. As a consequence, yield levels were reduced at all locations. For the second time in four years, the barley plots at Lacombe were severely damaged by hail. However, in contrast to the 1980 season, the advancement of materials was not greatly affected by the hail.

In the barley program, a major emphasis was placed on further evaluation of the barley semi-dwarf, BT521 (Samson), at both the plot and field scale level. Of particular interest was the mechanical lodging study carried out under high fertility. Based on this additional information, BT521 has been accepted for licensing as the first high input, high yielding, and lodging resistant semi-dwarf barley in Canada.

In addition to the success with BT521, the demand for Empress and Abee has remained high. The release of these varieties has resulted in a major "fine tuning" of the barley program. Further emphasis will be placed on the screening of the improved lysine material, high yielding hulless barleys, and perhaps malting types. Entries in the 1985 Co-op tests consist of one third year 6-row, one second year 6-row, three first year 6-row, two first year hulless 2-row (1 with improved lysine), and two first year 2-row with improved lysine. The 6-row line, BT518, was removed from the Co-op test after three years of testing, but will be further evaluated as a potential variety for the drier soils of the prairies.

Seed quality and maturity received priority in the spring triticale program in 1984. Included with these two traits was an increased screening for sprouting resistance within the available triticale germplasm, as well as within triticale x wheat populations. As a result of the 1984 season, one third-year, high yielding seed and silage line (T44), two first-year high yielding seed and silage lines, and one first-year early maturing, plump seeded line will be evaluated in the 1985 Western Spring Triticale Co-op.

The expansion of the winter cereal program to include Trochu, Lethbridge and Saskatoon facilitated the identification of lines with improved winter hardiness, as well as disease resistance. A major emphasis was placed on producing crosses involving short-statured, high yielding germplasm, and winter hardy material with acceptable seed quality. The attempt to transfer new genetic diversity into both the winter wheat and winter triticale was continued, utilizing backcrosses as well as top crosses onto the parental species. In 1985, the winter cereal research will be expanded into evaluation for milling quality. At present, a total of three winter wheats and seven winter triticales are in the B level winter cereal Co-op at nine locations in Alberta and Saskatchewan.

As part of the overall effort, the agronomy program was directly involved in evaluating lines from the spring breeding programs, as well as licensed varieties adapted to central Alberta. An important segment of this research was evaluating the spring species for high moisture grain and silage production, using differing planting dates as well as fertility rates. Of particular note was the fact that, with the dry summer the triticales did not respond to increased levels of nitrogen. Other areas in the spring cereals included the development of a rotational study at Olds, and a major screening for root rot resistance. These areas will be expanded in 1985.

Due to the dry fall in 1983, the agronomy studies intended for the winter cereals in 1984 were discarded due to poor emergence. However, a Farming for the Future Project (83-0094) on the physiology of cold hardiness was initiated. In general, it was found that the triticale germplasm tested showed a lower Lt_{50} than the wheat germplasm. Also, the Lt_{50} of the winter triticale check variety, Wintri (-6.8°C) was higher than the average for the triticale germplasm (-7.8°C). Work on the physiology of hardening, as well as snow mold, will receive additional emphasis in 1985-86.

Not all of the staff's time was spent only in the various breeding programs. As in previous years, field days and farmer meetings were given high priority. The joint Alberta Agriculture/Agriculture Canada Field Day proved to be a resounding success for a second year running.

B. CROP PROTECTION BRANCH

a) CROP INSECTS

i) Grasshoppers

Most of southern Alberta up to the foothills was generally infested by grasshoppers and spraying was prevalent throughout the Region. The infestation extended north to Drumheller and Three Hills. An estimated 300 thousand hectares, including right-of-way, pasture and crop lands were treated with insecticide, the most intensive control since the early 1960's. The heaviest infestations were in the area bound by Strathmore, Vulcan, Lethbridge, Foremost, south to the U.S. border and west to the foothills. Although spraying provided good control. the prolonged emergence and drought conditions necessitated repeat applications. The early fall reduced the need for protection of fall seeded crops. Generally, grasshoppers were a minor problem in the Provost-Wainwright area, largely as a result of mortality from heavy rainfall in early June.

Although the fall was early, the adult grasshoppers had ample time to lay the bulk of their eggs and as a result, severe infestations are anticipated in 1985. The 1984 grasshopper forecast map is attached.

ii) Cutworms

Pale-western cutworms were substantially more abundant than in 1983 with an estimated 70,000 hectares being treated in the Lethbridge and surrounding area. Isolated fields were infested with red-backed cutworms in Central, and Northern Alberta with a reported maximum of 400 hectares requiring treatment. Cutworm numbers are expected to increase substantially in 1985.

iii) Oilseed Pests

Flea Beetles - Seed treatments and/or granular insecticides continued to be used on about 90% of the crop in Alberta. An additional 4000 hectares are estimated to have received foliage sprays. Adult populations in the fall were higher than in the past 5 years and therefore, damage may be more extensive in 1985.

Bertha Armyworm - An estimated 2500 hectares of canola were treated to control bertha armyworm in the Edmonton-Westlock area, with an estimated 150 hectares requiring treatment northwest of Grande Prairie. The infestation was later than normal, the third week of August, and early swathing reduced the need for application of controls.

iv) Miscellaneous Pests

The European corn borer remained below economic levels and continued to move westward, (AHRC report). Forest tent caterpillar infestations were heaviest in east central Alberta and are expected to remain at moderate infestation levels for at least another season. Spruce budworms continued to increase in pure spruce stands throughout central Alberta. The first gypsy moth in Alberta was detected in a pheromone trap in Sherwood Park.

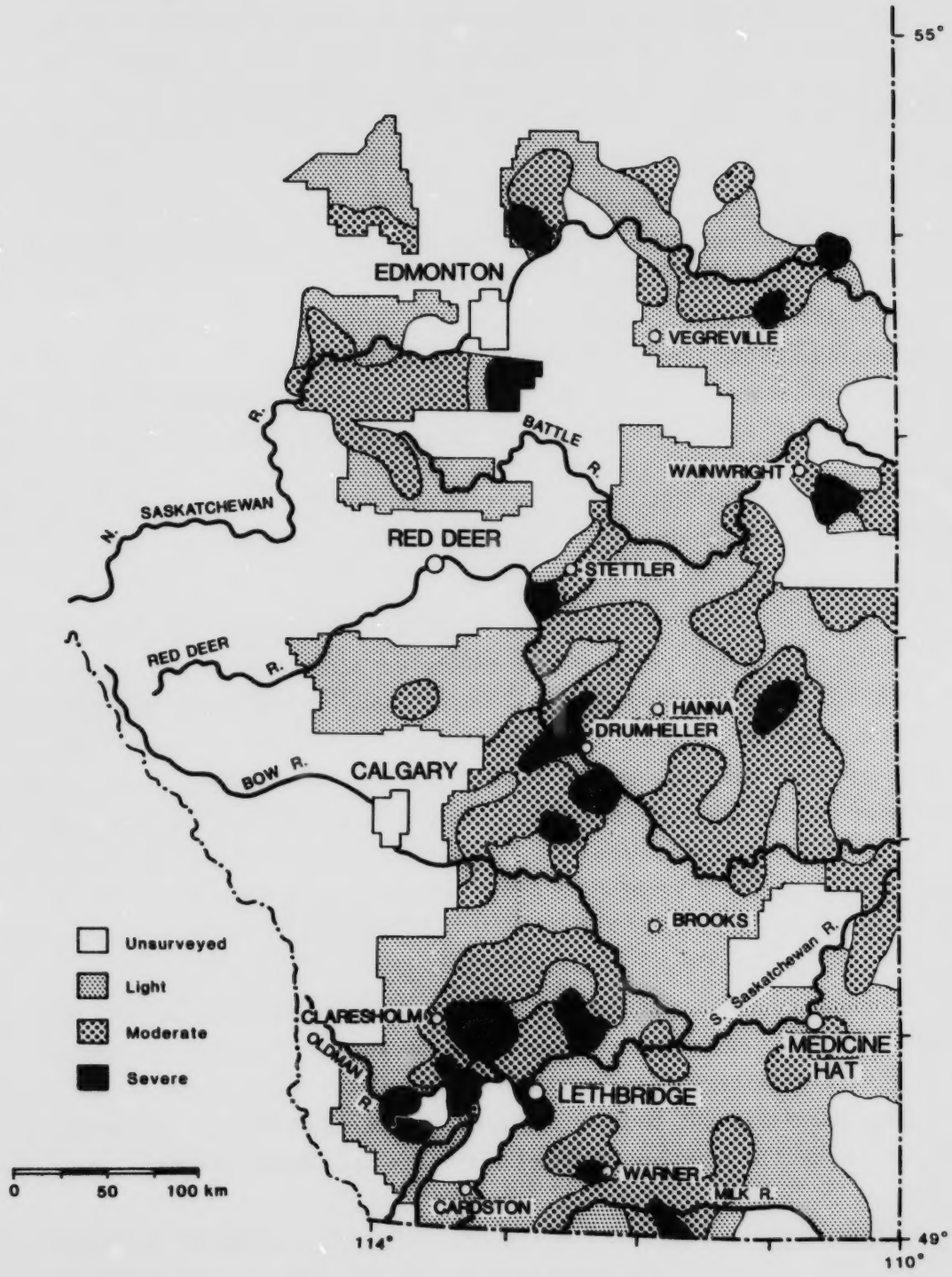
b) APICULTURE

Beekeepers in the northern two-thirds of Alberta have experienced their second consecutive large crop, while those in the south suffered another drought situation. Alberta's honey crop approached 30 million pounds, by far the largest on record, with a substantial number of beekeepers in the Edmonton and Peace regions reporting over 300 pounds per hive. Most other provinces in Canada experienced excellent honey crops to give Canada a total crop of 97 million pounds well above 1983's record of 85 million.

A record 80,000 hives entered fall in 1984 -- representing 46% of Alberta's hives. Unfortunately many of these were not properly prepared and winter mortality can be expected to be higher than normal. Many beekeepers hurriedly put bees into winter due to concern over the recent introduction of the honeybee trachael mite into the United States.

Acarapis woodi, the honeybee trachael mite was discovered in Texas in July 1984 and since has moved throughout 10 other states. Canada

1984 Grasshopper Forecast for Alberta



has placed restrictions on the importation of package bees from mite infested areas but to date, California, Alberta's source of packages, has not been infected. There is a considerable move within the industry towards wintering and self-sufficiency, in case sources of bees are restricted. Alberta, in co-operation with other provinces, has conducted a mite survey. To date, no mites have been detected in Canada.

The industry is still concerned regarding the eventual introduction of the Varroa mite, Varroa jacobsoni and the Africanized bees. The latter are presently migrating northward through Central America and are expected to enter the U.S. between 1988 and 1994 at present migration rates.

Six summer apiary inspectors were employed during 1984 for the control of bee diseases. The incidence of American foulbrood disease continues to decline, in incidence and severity, due to vigilance on the part of the industry and inspection staff. The commercial beekeepers are showing the most improvement.

Extension efforts continue to focus on self-sufficiency; i.e. wintering and queen rearing. These topics were the subject of field days and talks given in various points in the province in 1984. A fact sheet on the construction of effective winter wrap was prepared and other literature on wintering techniques was made available to beekeepers on request.

The Alberta queen rearing project has progressed from the research phase to the production phase through the assistance of Fairview College and, to a lesser extent, Olds College. The program produced 4,000 queens for distribution to beekeepers in Alberta and other provinces, in addition to the U.S. and Chile. This phase of the program is self-sufficient with funds provided by the sale of the queens. The stock was developed through a Farming for the Future research grant over 5 years. In addition, between 10 and 13 thousand 1985 packages were headed by queens from offspring of the program.

The major concern of the beekeeping industry continues to be the decrease in the price of honey. 1984 saw prices fall from 54¢ to 45¢ per pound to the producer. At average crop levels, this is well below the costs of production and 1985 could see honey producers in financial hardship if the price remains at 1984 levels. Reasons for the low price are a bumper Canadian crop and competition from other honey producing countries for international markets.

c) PLANT DISEASES

i) Forage Crops

Verticillium wilt of alfalfa is still limited to the irrigation areas of southern Alberta. The rate of spread of this disease is somewhat slower than expected.

Approximately 230 alfalfa fields were surveyed for Verticillium wilt (VW) across Alberta in 1984 (Table 1). This was a co-operative survey involving plant pathologists from Alberta Agriculture, Agriculture Canada and Alberta Environment. VW was found in 10 of the 87 fields surveyed in southern Alberta (Census Division 1 to 6). The disease remained concentrated in the irrigation districts of CD's 1 and 2. No VW was found in central Alberta (CD's 7 to 14) or in the 15 fields surveyed in the Peace River Region.

Table 1. 1984 Verticillium wilt of alfalfa survey in Alberta

Census Division	No. fields Surveyed	No. Fields With VW
1	7	1
2	39	9
3	11	0
4	4	0
5	10	0
6	16	0
7 & 14	128	0
Peace River Region	15	0
	230	10

ii) Oilseed Crops

Seedling blight occurred quite commonly in canola, particularly when growers seeded earlier than usual into cold soil. Seeding took place in some areas when soil temperatures at the 3 cm level were still below 3°C. In later seedings, seedling blight was most obvious in the poor stands showing up on the higher drier parts of fields.

Sclerotinia levels province wide, as a result of the unusually dry summer conditions, in most areas was at a trace to the 5% level. In a few isolated locations, subject to thundershowers from Spruce Grove to Smoky Lake levels of 30% to 70% stem infections occurred. Nine out of 66 fields surveyed under irrigation showed sclerotinia infection levels in excess of 30%. Twenty thousand acres of canola were sprayed with benomyl and 18,000 acres with iprodione for sclerotinia control.

The virulent strain of blackleg was identified at six locations in Alberta in a co-operative survey of 142 fields, up from the one field in 1983. Five of the fields were near the Saskatchewan border, east of Vegreville, and the remaining location near Edmonton.

Root rots, Alternaria and staghead were all reported at trace levels.

iii) Cereal Crops

Cereal leaf diseases showed early high levels in June at some locations, particularly tan spot in wheat, scald and net blotch in barley. Later on in the season the dry, windy conditions kept leaf diseases, including soft white spring wheat, to the lowest levels seen in many years.

Common root rot was reported to be somewhat less than in previous years but no hard facts were available on the actual levels. Take-all on wheat that was common on irrigated and dryland wheat in 1983 showed up at much lower levels in 1984.

Barley plots at Westlock, growing on organic peat soil, again showed a phenomenal response to air applied copper salts. Likewise wheat growing on sandy soil in the Lacombe area showed a remarkable yield response to soil applied copper.

Covered smut levels were generally at trace levels in wheat and barley. Loose smut was common in some fields of HY 320 wheat but again generally at trace levels in other wheats. In barley loose smut was unusually high in scattered locations from central Alberta to Fort Vermilion. Several fields of Bonanza in the Leduc area showed levels of 10 to 15%. Empress, Diamond, Bonanza at scattered locations and an unidentified variety at Vilna showed infection levels from 5% to 30%. One field of Argyle barley at Calmar showed over 20% covered smut infection.

Winter wheat seedings were much higher than normal in 1984 a reported 700,000 acres province wide. By April of 1985 in central Alberta, winter kill was extensive in central areas of the province. Winter kill presumably occurred from mid-October to December 1984 due to unusually low temperatures during that time. Survival of the crop occurred only when snow had drifted deep in October along headlands and hollows and amounted to often less than 10% of the stand. Survival of winter rye, which has much greater cold tolerance was good in all areas.

iv) Potatoes - Bacterial Ring Rot

The Bacterial Ring Rot (BRR) program is operated and administered by the Crop Protection Branch, Plant Industry Division. Seven municipalities, funded through department grants assist in the control program, and the Alberta Potato Commission co-operates by obtaining planting records and supplying lists of potato growers. The incidence of the disease in 1984 was the lowest in 30 years and was well below the previous 4 year average. A contributing factor in the control of the disease was the use of certified seed by most commercial growers. There was an increase in reports of potato wilts, and rhizoctonia remained a problem in field inspections. No BRR was found in pedigreed seed fields and fair to good yields should provide sufficient seed stock for 1985

planting requirements. The volume of Alberta grown seed potatoes exported to the U.S. northwest continues to grow with an anticipated increase of 25% over the previous year.

TABLE 1. POTATO ACREAGE AND INCIDENCE OF BRR IN 1984

District	No. of Farms Inspected	No. of Farms Infested	Acres (Hectares) Inspected	Acres (Hectares) Infested	% Infested Farms	% Infested Acres
Peace River area	10	1	229 (92.7)	18 (7.2)	10.0	7.9
M.D. Sturgeon	15	1	1770 (716.6)	70 (28.3)	6.7	3.9
County Parkland	3	0	997 (403.6)	0 (0.0)	0.0	0.0
Edmonton area	8	0	346 (140.0)	0 (0.0)	0.0	0.0
Barrhead area	5	1	186 (75.3)	4 (1.6)	20.0	2.1
Vermilion area	16	0	943 (381.7)	0 (0.0)	0.0	0.0
Red Deer area	20	2	653 (264.3)	5 (2.0)	10.0	0.8
Calgary area	16	0	133 (53.8)	0 (0.0)	0.0	0.0
County Newell	19	2	2,930 (1,186.2)	111 (44.9)	10.5	3.8
M.D. Cypress	4	0	62 (25.1)	0 (0.0)	0.0	0.0
M.D. Taber	43	2	11,274 (4,564.3)	125 (50.6)	4.6	1.1
County of Forty Mile	7	1	626 (253.4)	130 (52.6)	14.3	20.7
County Lethbridge	12	0	338 (136.8)	0 (0.0)	0.0	0.0
Lethbridge Perimeter	29	0	170 (68.8)	0 (0.0)	0.0	0.0
Totals	207	10	20,657 (8,363.1)	463 (187.4)	4.8	2.2
1981-84 Average	198	22.5	18,587 (7,525.1)	1,477 (597.9)	11.5	8.4

Of the 207 potato farms inspected, involving 20,657 acres (8,363.1 ha), 4.8% of the farms and 2.2% of the acreage was infested with BRR. The four year average (1981-84) is 11.5% of the farms and 8.4% of the acreage infested.

Regulatory and Policy

The Agricultural Pests Act was revised in 1984 and the BRR regulations under the Act are at present under revision. The Bacterial Ring Rot Review Board received no appeals in 1984. The seven co-operating municipalities, with 87% of the Alberta Potato acreage under their jurisdiction, continued to play a significant role in the control program by supplying inspection staff, information, and where required, disinfection services to their growers. The Alberta Potato Commission co-operated by supplying grower planting records and lists of growers in the province. For the third year BRR trial plots for field observation were carried out at the Alberta Tree Nursery and Horticulture Centre in co-operation with Dr. S. DeBoer, Agriculture Canada Research Station, Vancouver, B.C. Fifteen cultivars were tested for varietal response and latent BRR infection. Results of 1984 trials indicate that symptomless tubers of some varieties carried over from 1982/83 plots and planted in 1984 showed no foliage symptoms of the disease but BRR was found to be present in the stems and tubers. For the third year, several cultivars inoculated with higher rates of the bacteria showed no indication of the disease in the plant or tubers. These trials will continue in 1985.

The incidence of the disease in the 2.2% infected acreage (down from the 1981-84 average of 8.4%) remains at trace levels with little economic loss to the grower. Alberta continued to be free of BRR in the 3,400 acres (1,376 ha) of pedigreed seed inspected by Agriculture Canada, up 26% from 1983. One of the main objectives of Agriculture Canada is the continued rigid inspection of seed fields and the encouragement of provincial intensification of BRR control programs with the ultimate aim of eradication of this disease in Canada by 1991.

The following compilation of figures taken from 1984 planting permits of 207 potato growers across the province shows the number of acres and percentage planted using certified grade seed or better of the main varieties grown. The information on the permit is signed by the grower and is supposed to be correct.

VARIETY	RUSSET BURBANK	NORLAND	NORCHIP	NORGOLD RUSSET	OTHER VARIETIES	TOTALS
Acres (cert)	11,344	1,723	2,999	1,054	1,653	18,777
Acres (total)	12,504	2,176	3,073	1,148	1,756	20,657
Percent (cert.)	91%	79%	98%	92%	94%	91%

1)	Total acres grown (all varieties)	20,657
2)	Total acre planted with pedigreed seed	18,777
3)	Total no. growers (commercial and seed)	207
4)	Total no. growers planting pedigreed seed	151
5)	Percent acres planted with pedigreed seed	91%
6)	Percent growers planting pedigreed seed	73%

Almost all of the large acreage potato growers (50 to 1,000 acres each) used pedigreed seed entirely, while a number of small growers used their own or other commercial potatoes for planting in 1984. A few growers bought part of their seed from certified stocks and planted the balance using commercial seed. It is reasonable to assume that the use of the high percentage of pedigreed seed in 1984 was directly responsible for the lowest incidence of BRR (2.2% of total acreage) in recent memory.

v) Dutch Elm Disease and Fireblight

Alberta remains free of D.E.D. and the vector beetles. Phermone traps set up in southern Alberta did not yield any European elm bark beetles and visual examination of elms showing some dead branches and dieback symptoms did not show any signs of either beetle vector. There were a few reports of suspected D.E.D. but onsite examination and subsequent examination proved to be negative. Both species of beetles are present in Saskatchewan and Montana and D.E.D. in Montana is causing

considerable loss of elms at several central and southern towns. No D.E.D. has been detected in Saskatchewan for the past three years.

The abnormally dry July and August weather conditions may have been a major factor in the extremely low levels of fireblight reported in Alberta this year. The epidemic outbreak of this disease in 1982, province-wide, particularly on mountain ash, slowed down considerably in 1983 and was for all intents nonexistent in 1984.

REGIONAL LABORATORIES

i) Fairview

The Regional Crops Laboratory provided diagnostic and extension services to the Peace Region. A total of 349 specimens were processed (see the following Table).

SUMMARY OF SPECIMENS SUBMITTED
- FAIRVIEW -
APRIL 1, 1984 to MARCH 30, 1985

Crop	# Disease Specimens	# Insect Specimens
Field Crops	74	16
Ornamentals	18	4
Shelterbelt	68	27
Vegetables	12	6
Fruits	46	4
Miscellaneous	9	65
TOTAL	227	122

Entomology

Flea beetles reached extremely high numbers in August. No one sprayed, however, there is concern that numbers may be higher than usual in 1985. One hundred and fifty hectares were sprayed for bertha armyworm in Grande Prairie: The infested area was confined to Grande Prairie, Beaverlodge, Hythe and La Glace. The bedstraw hawkmoth created concern when it moved off the fireweed and into the canola. Fortunately little crop was destroyed and some unnecessary spraying was done. Lygus bugs

reached epidemic proportions in canola. No spraying occurred since no threshold is available.

One alfalfa field and two canola fields were sampled twice weekly for lygus bugs. Numbers were lower in canola. Confinement trials indicated that lygus caused more damage in the Polish canola varieties than in the Argentina varieties. Canola compensates for bud and flower damage. Seed damage is currently under investigation.

Plant Pathology

Barley, wheat and canola were showing signs of nutrient deficiency soon after emerging. Much of this was attributed to the cool, wet spring, and resulting denitrification of the soil.

A survey of canola fields showed root rot and alternaria blackspot to be the most widespread diseases (88 and 93% of 42 fields). Disease severity and yield effects were not measured. Sclerotinia stem rot was found in 57% of the fields, but tended to be low in severity.

The virulent form of blackleg of canola has not been found in the Peace Region.

In general, the incidence of foliar diseases of field crops was low this year. Fall rye appears to have wintered well, however, there was extensive damage to winter wheat especially in areas of heavy snow cover.

ii) Olds

This laboratory provided a diagnostic, survey and extension service on plant diseases, insects and weeds for Region II and the Western half of Region III. The lab also operated the Alberta Seed Potato Program, providing seed potato producers with their basic seed stocks and also providing growers with extension and field inspection services.

The Laboratory is primarily a back-up service to District Agriculturists, Agricultural Fieldmen and other extension agents. In this capacity, 402 diseases, 179 insects and 101 weeds were

processed. The main problems were: winter injury, drought, herbicide injury, thrips, mites, spruce gall aphids, leaf miners, blossom end rot and common scab of potatoes.

The Alberta Seed Potato Program supplied most Alberta seed potato growers with 27,344 pre-elite seed potato tubers. In addition, two acres of mother stock seed potatoes were grown and tested for disease to assure freedom from diseases. These stocks will be distributed to seed growers in 1986.

Alberta seed potato growers produced 1,295 hectares of seed potatoes with a total yield of 22,500 tonnes of which 9,300 tonnes were sold to U.S.A. growers, and resulting in 41% of our production being exported. Sales to the U.S.A. are up by 35% over 1984.

Seed potato plantings in 1985 are expected to be over 15,000 hectares. This will result in increased seed exports in 1986.

d) WEED CONTROL

Weed control in 1984 was generally excellent. The droughty conditions in the southern half of the province did not allow for a second flush of weed while in the northern half good spraying conditions facilitated good broadleaf and grassy control. An early snowfall limited fall soil incorporated herbicide applications to only 25-30% of intended acreage. This could result on an increase in post emergent herbicide use in 1985.

Several trends were observed in 1985.

(1) Economics of new product development, product specific registrations and the expiry of patents are stimulating the registration of tank mixes, the expansion of use patterns and the emergence of new trade names. These factors are creating stiff

price competition at the dealer level to a degree where some independents may not survive. This trend is likely to continue.

(2) The herbicide equipment technology is undergoing some changes with the commercial introduction of several shrouded boom sprayers, devices such as the sprayfoil and a variety of nozzle tips. European manufacturers are penetrating the Canadian market with at least two takeovers of domestic manufacturers.

(3) There is a continued need to alert producers to potential residue problems with some soil persistent herbicides. The trend towards more continuous cropping and a greater diversity of crop types are major factors creating this concern.

(4) The agricultural chemical industry is moving into the soil conservation mode with 7-8 registrations during their past year directed toward chemical fallow or the applications of herbicides during the fertilizer banding operations. Current product developments are anticipated to result in more registrations in this area. Simultaneous improvements in equipment are greatly facilitating this process.

Programs

Training and extension activities continued to provide field staff, industry and producers with updated technical information to facilitate effective weed control. Weed control updates, sprayer calibration clinics, weed inspectors schools and field sessions on the diagnosis of crop problems were offered to over 900 participants. In addition, active participation in regional and district extension meetings, commodity group meetings and specialized training schools such as the pesticide applicators course, petroleum industry training sessions and course directed at weed control in urban areas reached another 3000 clients.

The Weed Control Act continues to be actively used in most jurisdictions to persuade delinquent landowners to abide with their

responsibility of adequate weed control. Unfortunately the Act was not fully used to limit the movement of weed infested hay during the winter and the wider spread of weeds such as scentless chamomile is anticipated.

Two major Weed Fairs were held at Grande Prairie and Camrose in conjunction with the Canadian Agricultural Chemical Association. Total attendance was approximately 800 people, down from last year. The regional Mini-weed Fair concept expanded from one region last year to three regions in 1985. The combination of information booths, high quality seminar speakers in a comfortable local setting appears to appeal to many producers.

The section continues to work closely with the Agricultural Service Boards throughout the province providing guidelines, technical assistance and consultation on weed programs. Guidelines have been provided in the handling of weed control on railway properties, roadside brush control and the conduction of sprayer clinics. A co-operative project in conjunction with several Service Boards and the Department of Energy and Natural Resources is successfully arresting the spread of leafy spurge in the St. Mary's River. Another program is directed at the upgrading of municipal roadside sprayers to increase the effect of their roadside program.

The herbicide recommendation computer program is intended to aid in herbicide selection by matching weeds, crops, varieties and the respective leaf stages to potential herbicides. The program was designed for most effective use at the district level and the first steps have been taken in that direction with access now available in 6 regional offices and one district office. Expansion to other district offices is anticipated in the future.

The knapweed eradication program continued in Regions I and II. The infestation levels have decreased from 300+ acres in 1979 to scattered plants and small patches in 1984 with most municipalities aggressively attacking the problem. A more concerted effort will be placed on 4 municipalities in 1985. Good co-operation has been obtained

from Montana, B.C., which sprayed both the railway and the highway west of the border in the Crowsnest Pass and Energy and Natural Resources which inserted a knapweed control brochure in every hunting license issued.

Through a program of awareness and eradication, the nodding thistle infestation around Calgary has been reduced to small patches and isolated plants. Continued monitoring has identified several new infestations in other areas however the policy of immediate destruction is anticipated to prevent this weed from firmly establishing in this province.

The urban vegetation management program is progressing well. Co-ordination of the target weeds in the urban areas with those of the surrounding municipality is producing positive effects. Grants continue to assist towns and villages in the initial program establishment.

Provincial parks are highly visible and environmentally sensitive areas that are subject to weed invasion. Through our efforts weed management programs have been established at Fish Creek and Kananaskis Country park areas. Initial success in these areas is anticipated to assist in the adoption of good weed control measures in other parks.

Consultative services were provided to the CNR, CPR and Alberta Transportation to insure that they execute their legal responsibility of weed control on lands under their jurisdiction. The vegetation management budget of the railways has increased substantially and the objective on maintaining railway property to equivalent standards of adjacent landowners is slowly being met. The impact on land controlled by Alberta Transportation was less dramatic as 1984 was the first year of highway vegetation maintenance by private contractors.

The roadside brush control program was designed to assist municipalities, power transmission interests and others in establishing cost effective environmentally sound and aesthetically pleasing procedures for roadside brush maintenance. Through a publication "Roadside Vegetation Management, Operators Manual", lectures and consultation procedures these objectives are gradually being implemented.

Weeds and scrubby brush are major problems limiting the potential yields of natural and improved native pastures. Projects were undertaken in conjunction with several municipalities to develop practical methods of controlling wild rose, pasture sage, buckbrush and common tansy and will continue for 2-3 years.

The control of weeds along drainage ditches and irrigation canals are troublesome and environmentally sensitive issues. While some existing structures require remedial spraying, steps have been taken to encourage initial constructions which would facilitate more competitive and mechanical controls and less spraying.

Twelve demonstration projects were established throughout the province to demonstrate effective controls for Canada and sow thistle, scentless chamomile, leafy spurge, chickweed, cleavers and other species. Sites were used at local Agricultural Service Board tours and other extension functions.

Localized problem weeds such as tall buttercup, prostrate knotweed, blueweed, and leafy spurge as well as roadside vegetation control were the subjects of research activities in 13 municipal districts. Information obtained was transmitted through a variety of extension techniques to the producers with the problem.

Co-operative research projects were established in conjunction with appropriate agencies to develop solutions to major problems.

(1) Wellsite reclamation was a project established in conjunction with the Industrial Vegetation Management Association to develop reclamation techniques for abandoned oil and gas wellsites. Successful completion will yield information on the optimum soil amendments which will maximize the productivity of the reclaimed sites.

(2) Herbicide screening for weed control in legume and grass forages was designed to fill the existing information void in this area and subsequently assist in improving the quantity and quality of forage in the province.

(3) The "Evaluation of Herbicide Application Equipment" project was developed and initiated to systematically evaluate the new application devices on the market in order to provide the producer with concrete unbiased information on which to make his equipment selection.

The Weed Alert Program continued to provide valuable information on weed distribution as well as provide continuity of information to offset some of the negative effects of staff turnover at the municipal level. The mapping component continued to be used widely both within and outside the Division.

e) PROBLEM WILDLIFE

Responsibility for prevention and control of wildlife depredation of crops and livestocks remains with the producer, with assistance from the Municipal A.S.B. and A.S.B. Fieldman.

The Crop Protection Branch, Problem Wildlife Section, is responsible for a) supervision and co-ordination of provincial programs, b) extension, c) procurement and distribution of toxicants and control devices, and d) administration and implementation of portions of the Alberta Agricultural Pests Act.

The Problem Wildlife Section is comprised of a provincial supervisor, three regional supervisors, and four problem wildlife specialists. In addition, specialists were hired on a temporary basis to conduct coyote control in areas not easily serviced by permanent staff.

The Problem Wildlife Section is responsible for the supervision and co-ordination of three major programs: rat control, rabies suppression in skunks, and prevention and control of coyote depredation of livestock and poultry. In addition, the section provides extension services for the prevention and control of crop or livestock damage from field rodents (primarily pocket gophers and Richardson's ground squirrels), and nuisance birds (primarily magpies, blackbirds, sparrows and pigeons).

i) Rat Control

Alberta was kept essentially free of Norway rats for the 34th consecutive year. Rat control was conducted by the seven rural municipalities along the Alberta/Saskatchewan border in a control zone 30 km wide and 600 km long. The control program was conducted similar to previous years with one major exception: The M.D. of Bonnyville assumed responsibility for rat control in the area previously administered by I.D. 18. A total of 7,917 inspections of farms, grain elevators and other premises were conducted by municipal and provincial pest control inspectors. Each premise was inspected from 1-3 times during the year. Infestations were eradicated by the co-operative effort of residents and government personnel.

The number of confirmed rat infestations in the control zone declined for the second consecutive year (Table 1), primarily as a result of control effort in the M.D. of Provost. The pest control inspector for the M.D. of Provost was replaced in 1982/83 leaving a total of 146 rat infestations. Through the hard work and co-operation of the P.C.I. from Provost and other municipal and provincial staff, infestations declined to 86 in 1983/84 and 29 in 1984/85. This demonstrates that when rat control is neglected, two or three years of intensive control is required before the problem is firmly in hand.

Within the interior of Alberta, suspected rat infestations continue to be reported by a concerned public. Most complaints were found to be muskrats, pocket gophers, woodrats or mice. Many potholes dried up during late summer and fall, 1984, resulting in a marked increase in the movement of muskrat. Muskrats were found in the most unlikely places and

many were misidentified as Norway rats. Consequently, hundreds of suspected rat infestations were reported. Regardless, all suspected infestations were investigated by provincial and municipal P.C.I.'s. Nine rat infestations were confirmed within the interior of Alberta. Seven infestations were comprised of 1 or 2 wild rats. The remaining two cases involved domestic white rats that were being held by people who were not aware that Norway rats can not legally be held in captivity in Alberta.

Table 1. NORWAY RAT CONTROL ON THE ALBERTA/SASKATCHEWAN BORDER - 1984/85

	Bait Used		Inspection of	Infestations		
Municipality	Dry(kg)	Water Soluble (L)	Premises	82/83	83/84	84/85
I.D. 18	242	0	450	1	0	0
Vermilion River	2446	287	2200	37	33	45
Wainwright	999	590	1592	1	8	7
Provost	2004	1000	1700	146	86	29
Special Areas	1816	625	1020	11	13	12
Acadia Valley	360	10	387	0	1	1
Cypress	522	40	568	5	0	0
	8389	2552	7917	201	141	94

ii) Rabies Vector Control

The program to prevent the spread of rabies in Alberta, primarily in skunks, continued under the direction of the Central Rabies Control Committee.

Depopulation of skunks was conducted in conjunction with the rat control program along the Alberta/Saskatchewan border, to prevent the spread of skunk rabies into Alberta from Saskatchewan. Poison baits, traps and shooting were used to remove skunks. No rabid skunks have been taken in the control zone since 1977. North of the South Saskatchewan River, skunk rabies was not reported closer than 100 miles east of the Alberta border. Consequently, skunk control was terminated north of the South Saskatchewan River. Rabies control continued along the border

south of the South Saskatchewan River because rabies was reported in Saskatchewan immediately adjacent to the Alberta border. South of the River, rabies has been spreading westward in Saskatchewan for the last 2-3 years.

Rabies was found in skunks in the County of Forty Mile in 1979 and spread westward into the County of Warner. Rabies was also found in the County of Newell in 1981. Skunks have been depopulated in these areas since then with traps and poison. Skunk rabies has not been reported in the County of Newell since April, 1984, nor in the County of Forty Mile since 1982. Consequently, rabies control was terminated in these areas. Rabid skunks were reported in the County of Warner during January, February, July and December, 1984. However, control was terminated in the County of Warner in December, 1984, because known cases of rabies were sporadic and isolated. Confirmed cases of rabies in Alberta during 1979-84 are shown in Table 2.

Table 2. POSITIVE RABIES IN ALBERTA

	Skunks					
Year	Warner/Forty Mile	Newell	Elsewhere	Bats	Other	Total
1979	3	0	10	12	0	25
1980	53	0	1	11	1 cat	66
1981	22	1	0	9	1 dog	33
1982	14	29	0	7	1 horse	52
1983	27	3	2	5	3 cats	40
1984	4	3	0	5	1 dog	13

iii) Coyote Depredation Prevention and Control

The primary objective of the coyote control program is to train producers to resolve their own problems with assistance from municipal agricultural fieldmen. Provincial problem wildlife specialists train agricultural fieldmen, assist with difficult cases and assist when fieldmen can not respond to requests for control.

Non-lethal preventive techniques such as electric fences and guard dogs are promoted. There are still relatively few producers who use electric fences, but within the last 2-3 years electric fences have been built in all regions of Alberta. Their use is certain to become an accepted and wide spread technique to prevent coyote predation in the future.

The program relies heavily on the judicial use of toxicants. Human safety is emphasized. In addition, the importance of proper placement of toxicants is stressed to minimize non-target poisoning of wildlife and domestic animals. Cyanide guns and strychnine baits were the primary toxicants used for coyote control (Table 3), although single lethal dose 1080 baits were registered for use in 1984. In comparison to strychnine, single lethal dose 1080 baits are more specific to members of the dog family and less hazardous to humans, wildlife and domestic animals. Thus, 1080 will probably replace the use of strychnine within the next 2-4 years.

Table 3. TOXICANTS DISTRIBUTED FOR COYOTE CONTROL

Year	Cyanide Shells	Strychnine Cubes	Single Dose 1080	Large 1080 Baits
1982	1642	3700	--	13
1983	1278	3593	--	16
1984	1175	4184	147	15

The numbers of toxicants used for coyote control has not changed much in the last few years (Table 3). However, the use of toxicants by municipal agricultural fieldmen has changed significantly since 1977 (Table 4). Agricultural fieldmen have become more involved in coyote control; their case load doubled between 1977 and 1984. However, the number of toxicants used per case declined from 19.1 in 1977 to 7.9 in 1984. Moreover, the use of toxicants declined during fall and winter, increased in spring, and remained about the same in spring, and about the same during the summer (Table 4). This is a very positive change because the toxicants are being used with more discretion during the seasons when coyote control is most effective.

Table 4.

STRYCHNINE CUBES AND CYANIDE SHELLS ISSUED BY AGRICULTURAL FIELDMEN FOR COYOTE CONTROL DURING 1977 AND 1984

Year	No. of cases	No. of toxicants issued	No. of toxicants per case	Percentage of toxicants issued			
				Jan - March	Apr - June	July - Sept	Oct - Dec
1977	275	5263	19.1	36	10	21	33
1984	520	4125	7.9	19	25	31	25

Problem wildlife staff investigated 293 cases of predation during 1984, most of which involved coyote predation of sheep and calves (Table 5). The number of problem wildlife specialists was reduced from 6 to 4 in 1983. To compensate for the loss of permanent staff, personnel were hired on a daily basis as required to assist agricultural fieldmen with coyote control in 1984. Temporary staff made 136 farm visits at a cost of $88 per visit.

Fifteen 1080 baits were set during the winter of 1984/85, 14 within the M.D. of Cardston and 1 in the M.D. of Foothill. These baits were set to remove coyotes near sheep farms with a history of coyote predation. Cardston is the primary sheep producing area in Alberta.

Table 5. NUMBER OF CASES OF PREDATION INVESTIGATED BY PROBLEM WILDLIFE STAFF, 1984

Predator	Prey						Totals
	Sheep	Cattle	Hogs	Ducks & Geese	Turkeys & Chickens	Other	
Coyote	180	59	1	14	10	1	265
Dog	8	0	1	0	0	0	9
Wolf	7	5	0	0	0	0	12
Bear	1	4	1	0	0	0	6
Cougar	0	0	0	0	0	1	1
Totals	196	68	3	14	10	2	293

f) PESTICIDE ISSUES

The Pesticide Issues Coordinator has addressed a number of issues over the past year. Lasso, Canadian Wildlife cuts, methoxychlor, and the film Herbicide Trials were a few of them. The issues were dealt with through news releases, interviews with radio and newspaper reporters, and articles written by the coordinator.

Several seminars on the safe use of pesticides were presented by the coordinator to diverse groups such as farmers, District Agriculturists, District Home Economists, and Agricultural Fieldmen. Seminars in pesticide safety were also presented to livestock specialists and vertebrate pest specialists.

A high school text on pesticides and pest control was developed by the coordinator and field-tested by several teachers. Plans are underway to get this text incorporated into the high school curriculum. Already, the coordinator has addressed three teachers' conventions and outlined his text material.

C. SOILS BRANCH

Introduction

There was a continued strong demand by the farming public for information on fertilizer application, placement, and timing. The recently completed research project "Making the Most of Nitrogen" provided the basis for the revision of general and soil test recommendations. Farmers are also very interested in soil improvement attempting to increase production efficiency, especially with problem soils such as solonetzic, acidic and luvisolic (gray wooded). The Branch conducts applied field research and works co-operatively with other research institutions (federal, university, and private sector) to improve crop production and farm incomes.

a) AGRICULTURAL LIME FREIGHT ASSISTANCE (ALFA) PROGRAM

The program provides grants to farmers of 80 percent of the transportation costs above $5.50 per tonne for agricultural lime or marl from the quarry to the farm. In the 1984/85 year, a total of 11,697 tonnes were transported under the program for 81 applicants. Grants paid to farmers amounted to $302,743. Table 1 provides a summary of the program since 1981.

TABLE 1. Agricultural Lime Freight Assistance Program - Summary

Item	1981/82	1982/83	1983/84	1984/85
Number of applicants	64	100	141	81
Total grants	$166,313	$378,787	$601,657	$302,743
Number of tonnes	4,707	13,211	21,764	11,697
Average grant per tonne ($)	34.88	28.67	27.64	25.88
Average grant per applicant($)	2,598	3,780	4,267	3,738

Changes to the program were necessary to more equitably distribute grant funds. The major change was to limit the grant payment to $15,000 to any applicant within one fiscal year. Another change requires a lime requirement test report showing the original soil pH to be 6.0 or lower in order to show a definite need. The maximum transportation rates were changed for farmers residing in I.D. #23 (High Level, Fort Vermilion and La Crete) whereby the 7.0¢ per tonne kilometer rate will be extended for hauls up to 1,000 km and the 5.0¢ for hauls over 1,000 km.

The reduction in grants and applicants was the result of a dry growing season combined with an early snowfall in October. Some crops in the western portion of the Peace Region remained unharvested in the fall.

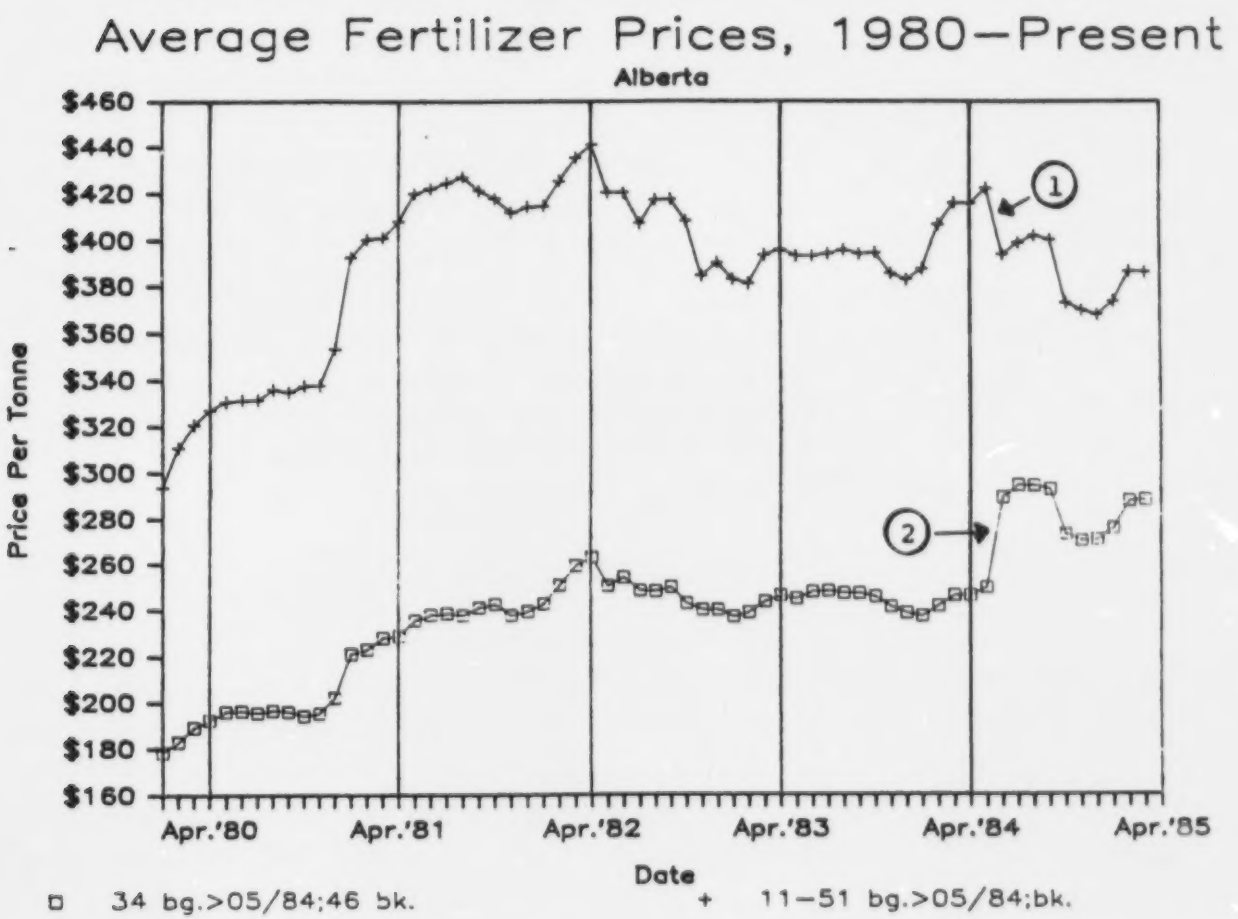
b) SOIL PRODUCTIVITY AND FERTILIZER USE

The main activities were extension and applied research related to soil and fertilizer management. Branch staff encountered a high demand for extension meetings and participated in 65 extension meetings with a total attendance of about 4,000 farmers. Staff also instructed at in-service training sessions for department staff and fertilizer dealers. Narrow cost/return margins maintained high interest in improving fertilizer use efficiency, particularly related to fertilizer placement, methods of handling and application (i.e. dual banding), cost of materials, and rates of application.

Fertilizer sales in 1983/84 increased moderately compared to 1982/83 (Table 2). Nitrogen and phosphorus use increased by 10 and 8 percent respectively. Fertilizer price trends are shown in Figure 1.

Sales activities of non-registered and unproven fertilizer products and soil amendments remained high. Producers waste a considerable amount of money on these products. The system of assessing and control of the sale of these products is weak.

FIGURE 1



1 Difference of $29/tonne--bagged vs. bulk

2 Difference of $45/tonne bagged 34-0-0 vs. bulk 46-0-0

TABLE 2. FERTILIZER SALES IN ALBERTA

(By Analysis and Nutrient Content in Metric Tonnes)[1]

July 1 - June 30

Fertilizer	1981/82	1982/83	1983/84
82-0-0 (Anhy. Amm.)	158,894	163,650	187,337
34-0-0 (Amm. NO_3)	90,376	98,658	75,811
46-0-0 (Urea)	161,780	187,226	226,243
21-0-0 (Amm. SO_4)	16,838	19,096	16,757
Other N	---	2,301	3,603
28-0-0 (N. Soln.)	28,607	28,255	30,948
22-23-0	38,900	---	---
23-23-0	38,900	2,301	3,603
27-14-0	12,095	---	---
Urea Phosphates	8,638	---	---
11-48-0 to 11-55-0	251,058	287,066	308,149
18-46-0	---	---	207
16-20-0	19,602	21,299	20,888
10-34-0	6,496	2,894	3,606
0-0-60 (KCl)	24,687	34,826	40,313
Others	19,593	10,289	905
Mixed (N/P/K)	8,239	13,556	---
Elemental S	---	---	4,341
TOTAL	845,803	869,116	919,108
Nitrogen (N)	299,360	303,815	335,906
Phosphorus (P_2O_5)	148,418	154,679	166,831
Potassium (K_2O)	16,244	21,841	24,900
Sulphur	---	7,973	7,191
Ag. Lime[2]	6,800	16,138	23,060

1. Source: Western Canada Fertilizer Association, Calgary
2. Alberta Agriculture

Variability in fertilizer recommendations provided by various soil testing laboratories continues to be a concern. Potassium, sulphur and micronutrient recommendations are a particular concern. Branch staff have been involved in providing extension information and have worked through the Alberta Soils Advisory Committee to develop an accreditation program for soil testing laboratories. Some progress was made toward developing an accreditation program through the Standards Council of Canada.

Applied research activities on both dryland and irrigated land are directed toward developing soil test calibration data for new crops and varieties and evaluating methods of fertilizer application. Fertilizer input cost were about $300 million in 1984. Increasing the efficiency of fertilizer use by optimizing the rate, method, and time of application can therefore significantly increase net returns from crop production. Recent research has identified differences in the efficiency of fertilizers relative to the time and method of application under various soil-climatic conditions. Recommendations and guidelines based on this research were published in a factsheet - "Applying Fertilizers Effectively" - Agdex 542-7.

i) Research Trials - Southern Alberta

Irrigated Crops - A total of 24 research trials were conducted with most major irrigated crops to determine fertilizer response and calibrate soil tests. The trials were designed to determine optimum application rates for nitrogen and phosphorus and to determine if potassium, sulphur, zinc, boron or copper are required. Funding is obtained through Farming For The Future project - Development of Fertilizer Recommendations for Irrigated Crops. Research on corn, peas, beans and sunflowers was conducted jointly with Dr. R. Gaudiel, Alberta Horticultural Research Center, Brooks.

Dryland Crops - Research trials were conducted at eight locations. All plots except one winter wheat trial were seeded on stubble and suffered severe drought. Only the winter wheat trial was harvested.

ii) Research Trials - Central and Northern Alberta

A total of 23 research trials were conducted in central and northern Alberta. Seventeen experiments were conducted with potassium fertilizers (with Dr. J.A. Robertson, University of Alberta) to determine:

1) optimum rates of application taking into account residual response from previous application, and the effect of previous K applications on soil test K,
2) the effect of potassium sources and chloride on diseases of barley, and

3) the effect of soil temperature and seeding date on the availability of soil potassium.

This project which began in 1979 will be completed in 1985. Results of 1984 were reported in a paper presented at the February 1985 Alberta Soil Science Workshop. A factsheet "Potassium Fertilizer Use in Crop Production" Agdex 542-9 was written (Country Guide Insert - June). The soil test calibration for potassium is being revised based on this study.

A project to evaluate fertilizer response of barley and canola varieties was started in 1984. Field experiments were conducted at four locations to determine fertilizer response of new varieties as compared to older varieties previously used for soil test calibration. Methods of fertilizer placement for canola were also compared. The results of this study will be used to develop variety specific recommendations if significant differences are found.

c) SOIL MANAGEMENT

i) Liming Acid Soils

Liming experiments were carried on at four locations. Long term effects of lime, lime sources, particle size, and ripping were evaluated.

Plots were established at Leslieville in the spring of 1983 to evaluate the neutralizing value of differing grades of lime. Soil and crop data obtained to date confirm the efficiency factors used to determine Total Fineness Efficiency. Other plot sites comparing liming materials and rates of lime have not shown any significant differences based on one year of results. A summary of the data from a liming trial established in 1970 has shown an average yield increase of approximately 11 bu/ac of barley. Soil test results have shown a gradual decrease in soil pH since liming, indicating a need to relime after 10 to 20 years.

A new lime supply has been developed in the Tumbler Ridge area of northeastern British Columbia. Steel Brothers Canada Ltd. at Exshaw and Summitt Lime in the Crowsnest Pass continue to supply agricultural lime. Griffon Lime Ltd. of Rocky Mountain House was placed into receivership and this source of supply is uncertain at this time. Genstar Cement Ltd. of Edmonton has discontinued marketing agricultural lime.

ii) Solonetzic Soils

Continued interest in subsoiling and deep ripping of solonetzic soils led to the investigation of 104 sites to determine soil suitability for ripping. In an attempt to reduce the cost of this investigation service, a pilot project was developed for the counties of Flagstaff, Stettler, Paintearth and Special Area No. 2. With the assistance of their district agriculturists farmers will sample their soils and submit the samples for analysis and recommendation. Information sheets and a sampling guide have been prepared for the extension offices. This program may be expanded to a province-wide basis.

A summary of the data obtained to date under the Deep Tillage Feasibility Study indicates that crop response to deep tillage is related to available soil moisture. Wheat response to deep plowing and ripping for four areas is presented below.

Table 3. Wheat Response to Deep Tillage (bu/ac)

Municipality	Deep Plowed	Ripped
Special Areas	7.2 (20*)	2.4 (18*)
County of Paintearth	9.2 (27)	5.3 (15)
County of Stettler	10.0 (15)	7.4 (8)
County of Flagstaff	13.0 (4)	0.8 (4)

*number of site years.

Plots with both lime and ripping treatments demonstrate that maximum crop response is achieved when lime is used in conjunction with ripping. Based on ten site-years, yield increases for wheat of 1.6, 6.1, and 8.6 bu/ac were obtained for lime, ripping, and combined treatments respectively.

Plot sites have been chosen for gypsum and multiple ripping evaluation.

iii) Other

Deep ripping is considered by some to be a solution for soil problems such as poor drainage and salinity. An average yield increase of 5.9 bu/ac of barley was obtained by ripping luvisolic soils at two sites. Two additional sites have been chosen and are to be ripped in the fall of 1985.

d) LABORATORY SERVICES

The branch operates the Agricultural Soil and Feed Testing Laboratory (ASFTL) which has four major service areas to:

i) Provide an analysis and recommendation service for soils, plants and animal feeds to the general public on a fee basis;
ii) Provide diagnostic and investigational services for Alberta Agriculture staff on a no-fee basis for special soil, plant and animal feed problems, and to demonstrate improved technology;
iii) Conduct applied research to delineate major problems in crop and animal production and where possible, to initiate and cooperate in projects to solve them; and
iv) Compile and summarize analytical data for recommendations, and diagnostic use.

i) Analyses and Recommendation Services

During the year 1984/85 a total of 43,204 samples were received for analyses representing an increase of 2,219 over the previous four year average. Producer sample numbers dropped markedly (28.7%) due primarily to an early fall snow (October 16) that essentially stopped fall soil sampling (Table 4).

TABLE 4. NUMBER OF SAMPLES ANALYZED IN 1984/85 AND AVERAGE FOR PREVIOUS FOUR YEARS*

Sample Category	Feeds & Plants 4 yr Ave.	Feeds & Plants 1984/ 1985	Soils 4 yr Ave.	Soils 1984/ 1985	Greenhouse/ Garden 4 yr Ave.	Greenhouse/ Garden 1984/ 1985	Total 4 yr Ave.	Total 1984/ 1985
Regular Producer	4,230	3,756	11,378	6,517	2,236	2,446	17,844	12,719
Diagnostic	2,439	2,637	2,060	1,775	242	262	4,740	4,674
Research	7,391	12,833	11,008	12,978	--	--	18,400	25,811
Totals	14,060	19,226	24,446	21,270	2,478	2,708	40,985	43,204

* Fiscal Year - April 1 to March 31

Private industry laboratories also provide testing services to producers and other agencies. A recent survey of seven private laboratories showed that during the year they tested 32,800 soil and 19,700 feed and plant samples. Thus a total of over 87,000 samples were analyzed by testing facilities in Alberta to assist producers with management decisions regarding use of soil and feed resources.

On July 1st, the service fee for regular analysis of soil, plant and feed materials was increased from $10.00 to $15.00 per sample. The fee for additional mineral analyses not included in the regular test was increased from $2.00 to $3.00 per analysis per sample. These new fees were set to reflect more closely the actual cost of analyses and to bring fees in line with private testing services.

The ASFTL continues to provide a regular analyses service to producers, however, the laboratory emphasis is toward diagnostic support to district and regional staff and to developmental research to improve diagnostic methods and recommendations (Figure 2). In the years 1975-77 regular producer samples represented 66 percent of the average annual soil sample volume while research and diagnostic samples represented 21 and 13 percent respectively. For the years 1981-84 only 38 percent of the annual samples were from producers and 44 percent were for research and 18 percent were for diagnostic.

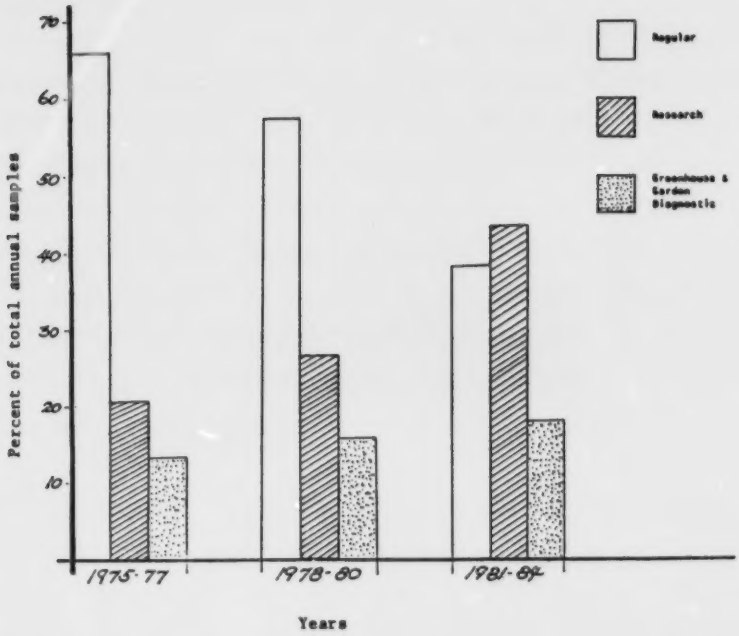


FIGURE 2. PERCENTAGE OF TOTAL ANNUAL SOIL SAMPLES TESTED REPRESENTED BY REGULAR PRODUCER, RESEARCH AND DIAGNOSTIC SAMPLES FOR THREE TIME PERIODS (1975-77, 1978-80, 1981-84).

ii) Diagnostic Services

These services are provided to Alberta Agriculture staff to assist in resolving on-farm production problems and to demonstrate improved technology for producers. Use of this service remained about the same as the previous four year averages. District Agriculturists were the largest users of the service as shown in Table 5.

TABLE 5. SUMMARY OF THE USERS AND SAMPLE NUMBERS FOR THE DIAGNOSTIC SERVICE.

Submitter	Sample Numbers	
	Soils	Plant & Feed
1. District Agriculturists/Fieldmen	742(41)	1,249(47)
2. Regional Specialists	20(1)	191(7)
3. Headquarters Specialists	556(31)	352(13)
4. Laboratory Staff at A.S.F.T.L.	376(21)	842(32)
5. Other Specialists	98(6)	9(0)
Total Samples	1,792	2,643
Number of Reports	489	983

* ( ) = Percent of total samples

iii) Developmental Research Services

This service is provided to assist soil, crop and animal specialists and researchers in the department and other public and private agencies with required analyses on agricultural research projects. Applications for research analyses require an applicant to provide project objectives, justification for the requested analyses and a sample submission schedule. Applications are approved if the laboratory has the capability to provide the requested services and the project objectives are specifically directed to identify and solve agricultural production problems.

A summary of 1984 research projects is provided in Table 6. The objectives for 23 percent of the projects were focused on evaluation and improvement of animal production and 73 percent were on crop production. Service work was conducted for various research agencies including: Alberta Agriculture (44%), Agriculture Canada (21%), University of Alberta (21%) and private industry (14%).

Much of the research conducted is complimentary to the improvement of diagnostic methods, interpretation of analyses and recommendations. An example is the near-infrared (NIR) analysis technology that is being developed in cooperation with the United States Department of Agriculture and the University of Alberta Department of Animal Science. NIR technology was used to determine nutrient constituent changes and animal performance factors related to various agronomic practices.

Several projects (Peace River, Lacombe, Calgary, Brooks) involved the study of crop diseases related to soil nutrient levels and physical factors. Many projects were conducted to improve soil nutrient recommendations based on soil tests.

Data Compilation, Processing and Analysis

No changes were made to the laboratory's routine soils and feed sample data processing and report generation functions. However, as in the past, there was considerable use of the laboratory's computer stored

data bases for routine samples. This included:

- Soil Test Summary; to provide acreage estimates and geographic distribution of average soil test levels of various fertility factors (P, K, S, pH, E.C., and Na) for the province, including computer generated provincial maps and frequency distribution statistics for various regions of the province.
- Soil test nitrogen summary of 1984 fall soil samples.
- Identification of acidic soils and their location.
- Soil test summary of newly broken land.
- Soil test summary of peat soils.

Substantial use was made of the data entry functions and data analysis capabilities of branch personnel plus the computer processing facilities for research projects both within the branch and in co-operation with various soil research institutions. These included:

- The development of the Alberta Soil Information System (AltaSIS) in cooperation with the Land Resource Research Institute in Ottawa for compiling, coding, and keypunching field research data for storage, retrieval, editing and analyzing.
- Phase 1 of the Forage Fertilizer Management Project; a cooperative effort by the Soils Branch of Alberta Agriculture, the Department of Soil Science (U. of A.), and Western Co-operative Fertilizers to analyze forage research data using AltaSIS.
- Soil pH maps of the County of Paintearth; a co-operative project between the Soils Branch of Alberta Agriculture and the Terrain Sciences Department of Alberta Research Council.

Equipment addition included the acquisition of an IBM PC micro-computer for ration formulation by the laboratory's animal nutritionists.

Soil Test Recommendations System

This project commenced in early 1985 and its purpose is to develop a computerized system to provide agricultural soil test recommendations for making cropping and fertilizer decisions for Alberta. This program will provide a mechanism for standardizing interpretations of soil test

factors as they relate to the yield response of various crops in Alberta and for formulating fertilizer recommendations covering a wide spectrum of management and environmental conditions. A Steering Committee composed of representatives of Alberta Agriculture and the private sector has been established to coordinate the activities involved in addressing this problem. It is proposed that this system will be accessible to all soil test laboratories in the province as well as farmers, extension staff, fertilizer agents and professional agrologists.

TABLE 6 SUMMARY OF 1984 RESEARCH PROJECTS FOR WHICH ANALYSES AND OTHER SERVICES WERE PROVIDED.

Project Number	Name of Supervisor and Project Title	Sample Numbers Soil	Plants
84-001	Bob Coleman, ADA (Horse Industry Branch) "Horse Feed Evaluation"	185	
84-002	Ross McKenzie, ADA (Soils Branch, Lethbridge) 1. Fert. Recommendations, Irrigated Crops 2. Fert. Recommendations, Dryland Crops	560	1552
84-003	C.W. Lindwall, CDA (Lethbridge) "Zero Tillage"	296	
84-004	Greg Dill, ADA (Field Services Branch, Lethbridge) "On Farm Mixing Studies		344
84-005	David Buck - College (Fairview) "Use of Growth Regulators for Forage"		1014
84-006	Walter Willms, CDA (Lethbridge) "Savory Grazing Method Native Rangeland"		50
84-007	John Harapiak - Industry (W.C.F.L., Calgary) "N-P Response on Annual Crops		1698
84-008	R.C. McKenzie, ADA (Irrigation Branch, Brooks) "Water Use of Wheat - N Requirement & Milling Quality"	204	288
84-009	R.C. McKenzie, ADA (Irrigation Branch, Brooks) "Water Use of Alfalfa & Canola"	66	
84-010	R.C. McKenzie, ADA (Irrigation Branch, Brooks) "Fertility & Water Effects on Potatoes	133	
84-011	R.C. McKenzie, ADA (Irrigation Branch, Brooks) "Reclamation of Leveled Land"	40	
84-012	L. Zach Florence, U. of A. "Genetic Micro Site Variation in Lodgepole Pine"	147	
84-013	J. Lickacz, A.D.A. (Soils Branch) "Solonetzic Soils Deep Tillage Study"	1200	
84-014	Garry Coy, ADA (Fairview) "Till Soil pH Variability Study"	500	
84-015	G.W. Mathison, U. of A. "Ruminant Feed Evaluation Unit"		318
84-016	S. Jaikaran, ADA (Animal Nutrition Section) "Reproductive Performance of Sows & Gelts fed Canola"		15
84-017	Dr. Malhi, CDA (Lacombe) "N-Loss Increasing Efficiency of Fall Applied Nitrogen ..."	2666	
84-018	Dr. Malhi, CDA (Lacombe) "Fertilizer Recommendations for Zero Tillage.."	937	

TABLE 6 (Continued)

Project Number	Name of Supervisor and Project Title	Sample Numbers Soil	Plants
84-019	Dr. Malhi, CDA (Lacombe) "Feasibility of Winter Cereals in Central Alberta ..."	164	
84-020	Dr. Malhi, CDA (Lacombe) "RAYP Proj. Phosphorus Fertilizer of Forages"		2144
84-021	David Wong/Roger Andreiuk, ADA (Spirit River) "Lime Plot Trials M.D. #33 & #20"	167	
84-022	H. Page Harrison, U. of A. (Ag. Eng.) "Chemical Treatment of Silage"		36
84-023	L.P. Milligan, U. of A. (Animal Science) "Control of Field Drying of Hay"		187
84-025	Bob Coleman, ADA (Horse Industry Branch) "Processing Feed Grains for Horses"		120
84-026	J. Lickacz/D. Penney, ADA (Soils Branch) "Lime Plots"	294	
84-027	A.W. Goettel, ADA (Soils Branch) "Away With Whey Study"	273	
84-028	Chinook Applied Research Association "N. Fert. on Crested Wheat Grass" "Phos. on Wheat" "Potass. Rate Trial on Wheat" "Fert. Placement Trial" "Annual Forages Trial" "Spring Seeded Winter Cereals Grazing Trial" "Wheat Varietal Trial" "Seeding Rate Trial" "Special Crops Demo Trial" "Sub Surf. Drainage of Saline Soils" "Surface Drain. of Saline Area" "Forages Trial - Saline Site" "Continuous Croppings vs Summer Fallow Rotation" "Stubble Heights Project" "Shelterbelt Project	87	185
84-029	E.S. Redshaw, ADA (ASFTL) "Trace Element Greenhouse Study"	25	33
84-030	W. Wishart, Fish & Wildlife "Alpine vs Low Elevation Forage Quality"		154
85-031	Ron Howard, ADA (AHRC, Brooks) "Soil Loosening & Root Rot Control"	132	11
85-032	J.A. Robertson, U. of A. (Soil Science) "P Placement on Barley"	276	

TABLE 6 (Continued)

Project Number	Name of Supervisor and Project Title	Sample Numbers Soil	Plants
85-033	J.A. Robertson, U. of A. (Soil Science) "K Rates on Barley"	400	
84-034	A.W. Goettel & M. Bjorge, ADA (Soils Branch) "China Saline Soil Project"	103	
84-035	D.C. Penney, ADA (Soils Branch) "Zambia Acid Soil Project"	62	
84-036	L. Piening & S. Malhi, ADA (Lacombe) "Head Melanosis in Park Wheat"	156	36
84-040	Klaas Broesma, CDA (Prince George) "Effect of Forage on Luvisolic soils"	50	
84-041	J.A. Robertson, U. of A. (Soil Science) "Agronomic Chem. & Min. aspects of Potassium in some soils of the Black and Dark Grey soils"	8	
84-042	J. Harapiak, Industry (W.C.F.L) "Long term fertilizer use and soil properties"		
84-043	J. Harapiak, Industry (W.C.F.L.) "Site characterization - 1983/84 trials"	312	
84-044	J. Harapiak, Industry (W.C.F.L.) "Chloride levels in plant tissue"		136
84-046	M. Nyborg, U.of A. (Soil Science) "Making the most of nitrogen" (Continuation of FFF work)	838	784
84-047	M. Nyborg, U. of A. (Soil Science) "APS & ATS as sulfur fertilizer"	147	
84-048	Neil Miller, ADA (Lacombe) "Forage evaluation for livestock nutr. County of Lacombe"		79
84-049	R.Colin McKenzie, ADA (Irrigation, Brooks) "Moisture and N storage in fallow and stubble"	118	
84-052	Y.K. Soon, CDA (Beaverlodge) "Beaverlodge Research rotation plots"	125	
84-053	J.T. Harapiak, Industry (W.C.F.L.) "Site characterization - fall 1984 trials"	72	
85-054	George Clayton, CDA (Vermilion) "Conservation tillage practices for cereal and oilseed crops in the lower Peace River region"		93
85-055	D.C. Penney, ADA (Soils Branch) "Soil test calibration for crops and var. (barley and canola)		704

D. ALBERTA TREE NURSERY AND HORTICULTURE CENTRE

a) SHELTERBELT PROGRAM

The demand for shelterbelt plantings continued to increase in 1984. The number of orders shipped increased by 17.5% from last year to 8,279. The number of trees and shrubs shipped increased by 19.8% to just over 2.5 million. These plants were used in the following ways:

Type of Plantings	Number of Seedlings Used
Farmstead Shelterbelts	1,995,515
Roadside hedges	57,682
Field Shelterbelts	110,081
Acreage Plantings	194,791
Townsite Plantings	32,854
Replacements	118,432
	2,509,355

The unseasonal spring enabled shipping to occur earlier than usual. Assembling of orders started April 17, 1984, and was completed on May 15.

The Alberta Tree Nursery & Horticulture Centre supplied school boards, municipalities and other organizations with Arbor Day seedlings. The first Thursday of May has been recognized as Arbor Day in Alberta. In 1984, 42,454 seedlings were distributed.

During the winter months, 1.44 million hardwood cuttings of popular and willows were produced. Approximately 63% of these cuttings were successfully propagated. Harvesting of these cuttings was not completed because of the early snowfall in October. In the 17 days in October that lifting was possible, 2,279,000 seedlings were dug, graded and placed into storage for shipping in spring, 1985.

Seeding of nursery crops was completed before the untimely snowfall. Caragana was seeded on 3.67 hectares. The other plantings accounted for 11,291.5 meters.

Seed required for the Nursery's programs is collected from sources on and off the site. It is processed, cleaned and then stored. The seed inventory in cold storage at the end of the year was over 1600 kg.

645,000 seedlings of spruce and pine were raised in the greenhouses and transplanted into the field in August.

The shelterbelt specialist held several courses on shelterbelt design and maintenance. Sixty-eight people attended the annual pruning courses held at ATN&HC.

b) CONTAINER PROGRAM

In 1984, container production in the greenhouses totalled 1,232,310 seedlings. Production of deciduous seedlings dropped slightly but the number of conifers produced increased by 27% compared to last year.

1,628,688 seedlings overwintered in the lathhouses. A mortality of 20% was recorded in 1984.

A total of 11,792 native trees and shrubs were shipped to various provincial parks in one, two and five gallon pots.

c) HORTICULTURE EXTENSION

Horticulture extension provided a liaison between the department and organizations providing services to backyard gardeners, such as the urban municipalities, colleges, universities, horticultural societies, the Devonian Botanic Garden and the Alberta Horticultural Association.

In addition to the eighteen regional courses offered each year, twelve other courses and short presentations were given to agricultural societies, further education councils, farm wives conferences, etc.

The number of telephone inquiries increased to 5,800 and the "hort hot-line" received 2,484 calls. Six hundred and ninety six soil reports for home gardens and turfed areas were completed. Six displays were produced for major horticultural events in the province.

d) TURF PROGRAM

The turf specialist assisted sod producers and turf managers on production problems, insect and disease control, cultural practices and marketing.

Research involved cultivar evaluations of perennial ryegrasses, Kentucky bluegrasses and various grasses suitable for low maintenance conditions. Cultural trials included sod heating, growth retardants, winterizer fertilizers and fairy ring control.

Because of the government's commitments to restraint and reduction of the civil service, the turf program was terminated on March 31, 1985.

e) MARKET GARDEN VEGETABLE PROGRAM

Extension services on all aspects of production and the industry were provided to commercial vegetable and small fruit growers in central-northern Alberta. A close liaison was maintained with the various advisory committees, marketing boards and grower's associations.

Numerous cultivar trials were held to investigate the performance of newly released cultivars of eight different vegetables. Cultural techniques to determine better production methods and increase yields were also evaluated. Much of this work concentrated on the use of mulches and tunnels for vine crops. Demonstrated improvement in earliness and yields with plastic mulches and tunnels have resulted in increased use of this technique by producers.

f) NURSERY TRIALS

During 1984, six woody plant investigations were being conducted. These included research into:

- herbicidal weed control of nursery crops
- evaluations of container growing media
- overwintering of large container stock
- seeding density of various nursery crops
- bare root stock vs. container grown stock.

Evaluation of trees and shrubs for suitability in Alberta is also being conducted as a joint program between Alberta Agriculture and Landscape Alberta Nursery Trades. This program is in its second year and will run for another ten.

A more comprehensive description of the programs and activities of ATN&HC may be obtained by requesting the 1984 Alberta Tree Nursery and Horticulture Centre Annual Report.

E. ALBERTA HORTICULTURAL RESEARCH CENTER

a) VEGETABLE PROGRAM

The vegetable program conducted cultivar evaluations in two processing vegetable crops and eight fresh vegetable crops. Studies were conducted on the effect of plant populations on several vegetables. A trial was continued where fall and spring seeding were compared and fluid drilling was evaluated. Fall seeding provided earlier yields in most cases.

b) MARKET GARDEN PROGRAM

The effects of mulches and tunnels on earliness and total yields of vine crops and other hot weather crops continued to receive attention. Cultivar evaluations were conducted for seven vegetable crops. The program continues to co-operate with a national asparagus breeding program.

c) POTATO PROGRAM

This program continues to test cultivars as part of the Prairie Regional Trial system and seedlings developed by the Prairie Breeding program. Trials were also conducted on the value of fungicide treatments in reducing seed piece decay.

d) SPECIAL CROPS PROGRAM

A series of cultivar evaluations and improvement of production practices highlight this program. Nine major new or special crop commodities are covered. Co-operative projects were also conducted with the Field Crops Branch and the Alberta Hail and Crop Insurance Corporation. An annual forage project funded by Farming for the Future

was also continued. This project includes cultivar evaluations and various cultural trials.

e) POMOLOGY PROGRAM

The evaluation of a number of production techniques (pruning, winter protection, etc.) of strawberries, raspberries and saskatoons, were the main emphasis of this program. Two new raspberry cultivars Redbrook and Fallbrook were released by the Center.

f) ORNAMENTALS PROGRAM

The AHRC arboretum has over 500 taxa of woody ornamentals as a permanent display collection. Hardiness testing of a variety of ornamental materials is the major component of this program. In 1984 AHRC became one of the seven test sites in an Alberta Regional Woody Plant Test Program. A trial to evaluate the use of spent greenhouse media in bedding plant production, indicated that it produced plants of better quality than standard mixes, however economics may not be acceptable.

g) GREENHOUSE PROGRAM

The evaluation of different growing media, or containers for greenhouse vegetables, was a major component of this program. Pruning techniques and fertilizer regimes also received attention. Several new crops such as Iceberg lettuce, climbing beans and alstromeria lilies were evaluated for adaptability to Alberta greenhouse conditions.

h) PLANT PATHOLOGY PROGRAM

Soil loosening using a Howard Paraplow to control root rot of pulses was evaluated in a number of commercial fields. Studies of greenhouse, potato and forage diseases continued. This program was involved in three disease surveys across the province.

i) ENTOMOLOGY PROGRAM

A comprehensive survey of the European Corn Borer was conducted. A number of control trials were instituted. Staff also participated in a survey for Dutch Elm Disease.

j) WEED CONTROL PROGRAM

Trials for weed control, where new herbicides or candidate herbicides are evaluated, were conducted in most crop areas for which the Center maintains responsibility. Several farm demonstrations, particularly in nurseries were well received.

The effect of herbicide residues on succeeding crops was a project funded by Farming for the Future.

k) REGIONAL CROPS LABORATORY PROGRAM

In excess of 1,600 specimens were received by the laboratory. Approximately 35% were woody ornamentals. The Center's part-time information officer supported the laboratory by answering in excess of 2,300 telephone enquires in the period June 1 to August 31, 1984.

l) POST HARVEST PHYSIOLOGY PROGRAM

Handling and storage studies on vegetable crops and ornamental plant material was continued. The program continues to emphasize improving quality out of storage.

m) FOOD PROCESSING AND QUALITY EVALUATION PROGRAM

This program investigated several areas of vegetable processing, including predicting the storage quality of potatoes and evaluating the radiography to monitor processing changes of vegetables. Additionally it supports the evaluation of numerous cultivars tested in other programs.

A more comprehensive description of AHRC research and extension activities may be obtained by requesting the 1984 Alberta Horticultural Research Center Annual Report. Details concerning cultivar evaluation trials on various crops are available in the AHRC Pamphlet series. These are available from the Librarian, AHRC, Bag Service 200, Brooks, Alberta TOJ OJO.

IV. REGIONAL REPORTS

REGION ONE - LETHBRIDGE

Dryland agriculture suffered from a long and widespread drought. Native range and improved pasture stocking rates were reduced to prevent irreversible damage. Some operators used annual cereals as emergency pasture and hay. Dryland hay yielded only one fair cut. Most pastures were close enough to rivers, irrigation ditches and other water sources for water to be pumped in to refill the watering holes. The September rains started the revitalization of dryland grass.

The drought assistance program and the All Risk Crop Insurance programs were very much needed and appreciated by farmers in the dry areas.

There was a problem with soil drifting on dry and irrigated land in the spring. Some crops were reseeded. The poor rainfall and light crops has caused a situation whereby soil erosion by wind is a larger potential problem this winter and likely into 1985. Winter soil erosion was only combated with the use of heavy equipment using rippers and other extraordinary measures. The fall rains allowed the soil to freeze so deep and hard that conventional farm equipment was ineffective. Fields which were over cultivated were the worst affected.

The dryland crops of cereals and oilseeds yielded well below average. Some fields where spring soil moisture was not conserved yielded so poorly that only the low spots were harvested.

Irrigated crops generally benefited from the warm summer although some areas experienced water shortages of various durations which depressed yields in those particular districts.

Areas where canal rehabilitation was complete were spared these shutdowns. Irrigation equipment which did not have enough capacity such

as one section pivots on light land soon showed their deficiencies with the poor soils suffering the greatest.

The fall rains and snow interfered with some harvesting of potatoes, carrots and sugar beets to the extent that some fields were abandoned.

Winter wheat yielded well and the fall rains have encouraged many more acres of this crop. The early freeze up has prevented normal fall growth of winter wheat, fall rye and alfalfa.

The weed and other pest programs were continued without any problems. The possibility of imported hay containing the restricted weeds diffuse or spotted knapweed triggered the hay reporting and inspection program. To date, no new infestations have been introduced through hay imports.

The hot dry summer and fall has provided good egg laying conditions for the pale western cutworms and grasshoppers. The grasshopper's egg laying was interrupted for a short time by the fall rain. There were isolated attacks of woolly bear caterpillars on native grass.

REGION TWO - AIRDRIE

Extreme drought struck Region II in 1984. What appeared to be an ideal spring for seed bed moisture and early growth gradually shifted to severe drought. Many parts of the region received only 4 to 6 inches of growing season precipitation. The result was extremely poor yields on recropped fields. Some fields were so bad they were not harvested. Summerfallow crops fared much better with some dryland barley yields in the 50-60 bushel range. Wheat yields varied from a low of 5 bushels per acre on stubble to 30 bushels on fallow. In contrast to 1983 however, bushel weights were good.

The region also experienced severe spring wind erosion with June 1st remembered as a particularly bad day. With poor crop in 1984 and resultant light crop residue after harvest, the regions crop land was left extremely vulnerable to wind erosion in 1985. This threat will become more pronounced if summerfallow is widely practiced.

Pastures were badly overgrazed in 1984 because of drought and this problem will now require several years of intensive management to bring pastures back to normal condition. Pastures in 1985 are of particular concern in the short run. A livestock drought assistance program was implemented in 1984 to assist cattle producers.

While grasshoppers were predicted to be bad in 1984 they did little damage compared to what they did in Region I to the South. Numbers of hoppers in the fall however pose a threat to 1985 spring crops.

In contrast to the spring of 1984 when there was no sub-soil moisture, the year closed out with excellent sub-soil moisture reserves, the best the region has seen in about 10 years. This resulted from 3 to 7 inches of precipitation that fell over most of the region in September. This added soil moisture, encouraged farmers to significantly increase their winter wheat acreage above what normally would have been planted.

Winter, much earlier than usual, set in in October with snow and extreme abnormally low temperatures. -27° was reported in the third week of October.

Extension courses emphasized production in 1984 with wheat, barley and canola meetings held at the regional level.

Soil conservation received significant attention in the region. The threat of wind erosion was constant throughout the year and threatens to be bad in 1985.

The regions 12 seed plants had another successful year. The Carstairs Seed Plant rebuilding program was halted during construction when the contractor ran into financial problems.

The Calgary Seed Fair & Hay Show held its last fall show when it was decided that the "Round-Up" fall agricultural exhibition would be terminated.

The Chinook Applied Research Association (C.A.R.A.) moved into their new building facility in Oyen in the month of October.

As 1984 closed out the excellent soil moisture situation projected some optimism that crops should be much better in 1985.

REGION THREE - RED DEER

1984 will be remembered by most as the year of the big drought. Precipitation in the southern and eastern parts of the region was almost non-existent from mid-June until September, and was below average throughout the region. Fall rains and an early snow cover helped to replenish sub-surface moisture supplies so that crop prospects for 1985 are improved.

Field Crops

Yield prospects in May and June were excellent as good germination and rapid growth resulted from ideal moisture conditions in the spring. However, lack of moisture during the summer deteriorated crops to the point where most districts had below average yields. Only in the northwest third of the region did crops do well.

In the spring, canola prices and quotas looked attractive and producers responded by increasing their canola acreage considerably. Even in the brown soil zone, many producers allocated some acres to canola production. However, in spite of the high acreage, total production was only average as canola probably suffered more from the drought than any other crop.

Wheat acreage increased slightly while forage and summerfallow acreage dropped. Coarse grain acreage remained about the same. However, a considerable amount of barley and oats was grazed or baled off for winter feed as forage production was way down.

Interest was high in the growing of the 3M type wheats. Many producers had contracts with the Canadian Wheat Board to grow HY320. Some had also obtained seed of the American feed wheat types and will be testing these in coming years.

Pastures have generally been over-grazed for the past 2-3 years and really suffered last year. Many were forced to graze cropland or begin feeding early to ease the pressure. Hay yields were only 50-75% of

normal. Any surplus feed supplies producers had were quickly sold and at very high prices. Any extra straw was also baled for feed.

Fall rye and winter wheat withstood the drought as well as any crop so many farmers planted these crops in the fall of 1984 - especially winter wheat. There could be 10,000 acres of winter crops seeded in central Alberta this year.

Seed cleaning plants had a good year with many cleaning record volumes. Total volume for the region approached 5.3 million bushels. Separations accounted for most of the increased volume.

Many plants took advantage of the up-grading program to improve their facilities.

Soils and Soil Conservation

High winds results in considerable soil erosion in the spring. Producers need to place more emphasis on good cropping practices to maintain adequate ground cover and high organic matter levels. Snow cover in the fall was excellent so soil drifting during the winter was almost non-existent.

With the current tight financial situation facing growers, many have changed their fertilizer practices to get the most from every dollar spent. Banding is the common placement method using anhydrous ammonia, granular, Cold-Flo or liquid. Blends and "double-shooting" are becoming more popular also.

With the early snow fall, very little fertilizer or soil incorporated herbicide was applied in the fall.

Lime application to improve soil pH is becoming an accepted practice.

Producers on solonetzic soils are doing more and more ripping to improve soil structure. The cost of ripping is only about 40% the cost of deep plowing.

Weed Control

Perennial weed infestations are increasing as continuous cropping becomes common. Canada thistle and quack grass are the two main weeds. Scentless chamomile infestations spread and, with the extensive feed movement, should increase even more in future years.

There seems to be a trend away from soil incorporated herbicides toward more post emergent type of control. Soil and moisture conservation is the main cause of the shift.

Horticulture

Demand remains strong for extension information on shelterbelt establishment, farmstead planning, pruning, and vegetable production. Two part-time people were employed to assist with the requests but demand still outstripped staff availability.

The number of hobby gardeners continues to rise.

Pest Control

Grasshoppers were the biggest concern of 1984. Some spraying was done in eastern districts but generally infestation levels remained below economic thresholds. However, a close monitoring program will be needed for the next few years.

Forest tent caterpillars decreased to the point where little damage was done. Small areas of spruce budworm infestations occurred. Diseases of cereals and oilseeds were down considerably with the dry weather. Some spraying was done for sclerotina control in canola.

Agri-Business

The canola crushing plant in Red Deer was re-opened for business after a year of inactivity. Deliveries are starting to increase.

The lime pelleting firm in Rocky Mountain House closed after a short career.

The Westerner Exhibition Association in Red Deer hosted the first annual Agri-Trade Show. Machinery dealers from across North America entered and farmer response was excellent.

REGION IV - VERMILION

The following is a short summary of some of the major trends and concerns in the Plant Industry Section in Region IV in 1984.

Soils and Soil Conservation

While the dry summer affected grain yields and quality it also was apparent that adequate fertilizer applied by various methods of "banding" application was beneficial in assisting crops to withstand the drought. Anhydrous ammonia and banded dry fertilizer became the most common application methods.

Producers are becoming aware of other possible nutrient deficiencies, the most common being sulfur and potash. Both are becoming a part of more and more fertilizer programs.

The Agricultural Service Boards are attempting to overcome and prevent several instances of water and wind erosion problems. This is particularly true in the northwestern portions of the Region where water erosion has been a serious consideration for many years.

The problem of dryland salinity in the solonetzic soil area became very evident in the spring of 1984. No clear cut answer seems evident, although cropping management and consequently reduced summerfallow acreage seems one of the stronger alternatives.

Management decisions have made fall cultivation a common practice. Unfortunately, this is in direct opposition to practices designed for snow retention and moisture conservation. Somehow these two practices must be combined for the benefits of both.

Field Crops

Dry summer conditions affected yield and quality of cereals and oilseeds in several parts of the region. Wide variations in yield and quality occurred depending on the occurrence of summer showers.

HY320 was grown successfully by several farmers under the Canadian Wheat Board Contract Program. Yields and quality were encouraging and corresponded closely to research data. These growers were interested in growing the semi-dwarf wheats if a market exists for their sale.

Columbus and Katapawa wheat were grown on a considerable acreage replacing Neepawa. The easier threshing of both of these wheats plus a good sample appearance was the reason for their use. Yield differences compared to Neepawa were small. Wide interest was also shown with several new barley varieties, Leduc, Empress and Diamond being some of the more widely grown new varieties. Farmers have experienced a problem getting an accurate germination test on Columbus wheat.

Native pastures continue to be overgrazed and are dependent on each year's rains. I can see little change in this situation. The need exists for more use of annual pastures and rotational grazing.

The municipal seed cleaning plants cleaned and separated 5.5 million bushels of grain. Continued participation in the upgrading program has improved cleaning capability and capacity. Two replacement plants were built in 1983 and 1984 with another in planning stages for 1985. These plants play a vital part in the production chain of Alberta Farmers.

The information obtained from the Cereal and Oilseed Variety Testing Program was accepted and used by producers in the Region. As more sites become established and reliable information assembled overtime, the benefits to all producers will become very evident.

Pest Control/Disease Control

Plant diseases were a greater concern in 1984 in several areas of the Region. Early season diseases included spot blotch and tan spot of wheat, root rot complexes in wheat and barley, stem blight of canola and later in the season, sclerotinia stem rot. Virulent blackleg of canola was a concern because of the nearness of infestations. The importance of preventative measures combined with correct management practices continue to be stressed.

The bertha army worm was present late in the growing season on canola. Fortunately, swathing prevented most fields from being damaged, however, spraying was done on a limited basis. Concern is present for 1985 as the population continues to grow gradually. The correlation of moths to subsequent larva numbers of both cutworms and bertha army worms is a continuing problem.

Grasshoppers did not develop into a serious problem, although some problems were encountered on rangeland in the MD's of Wainwright and Provost. The potential for a serious outbreak exists in these areas in 1985.

Forest tent caterpillars continue each year. The cycle did not abate in 1984 with a more serious problem possible in 1985. Large numbers of native poplars are dying due to a combination of age, lower moisture conditions and repeated defoliation by forest tent caterpillars.

Blackflies in the Lac La Biche area along with other fly species and mosquitoes were problems to livestock producers. Preventative measures, products and management practices are all helping to assist the producer in insect control.

Horticulture

The Farmstead Shelterbelt Program is widely accepted and utilized throughout Region IV. The farmstead generally is well planted by concern continues for the removal of native trees from fencelines, bluffs, pastures, and sloughs. Little interest is present concerning field shelterbelts and their relationship to soil conservation and beauty.

An increase in the number of garden clubs and horticultural societies is promising. These groups are especially interested in pruning demonstrations, beautification, farmstead planning, care of plants and horticultural exhibitions and shows.

Some promising demonstration orchards exist in Region IV. It is evident with the proper care small fruits and apples are capable of

good production. Some varieties of plums and pears are also being successfully grown in home orchards.

Farm people are continually interested in obtaining assistance in planning, selection and care information. Local participation groups such as garden clubs and horticultural societies are beginning to supply some of this needed information.

Weed Control

The presence of wild mustard, lady's thumb, green smartweed and other similar species of weeds in canola triggered an interest in Triazine tolerant canola demonstrations. The need to maintain an adequate canola acreage under difficult weed control measures will continue to support the Triazine Tolerant Canola Program.

Continuous cropping by farmers almost immediately points out the seriousness of Canada thistle, couchgrass and in some districts, toadflax. The spread of these persistent perennials and the consequent cost of control, either chemically and or culturally, is a major consideration of farmers in Region IV.

A major emphasis through a series of regional weed tours, district meetings, media and personal extension was made in the area of weed control recommendations which include cultural and/or chemical methods. The growing number of products available enforces the need for product information by the farming public.

The extensive role of the Agricultural Service Boards in weed control continued to be of utmost importance. The multi-emphasis aspect included regulatory, chemical control, extension information and demonstration and co-ordination with various governmental, private and local agencies and groups.

REGION FIVE - BARRHEAD

The total 1984 crop season precipitation varied from normal to 120% above normal in the Barrhead/Whitecourt areas. Indications of an early spring were present as below average snowfall allowed field tillage to commence in early April. Larger farmers began seeding by the end of April as lack of subsoil moisture was causing concern. Seeding was general throughout the region by May 10th. Cool damp windy weather however, kept soil temperatures lower delaying germination. High number of herbicide crop tolerance complaints were reported in June due to rapid growth of crops.

On June 29 a major hailstorm - tornado started in Drayton Valley and progressed through Barrhead and Athabasca areas causing damage to crops and more serious damage to farmsteads. Most crops recovered due to early stages of development however forage crops were more seriously affected.

Dry conditions reduce the potential outbreak of sclerotinia white mold in canola. But fungicide treated acres still increased over the previous year. One report of virulent strain of blackleg in St. Albert area. Other crop diseases included root rot, smuts and leaf diseases. Experimental tests conducted in Westlock area the past two years for barley leaf diseases and micronutrient deficiencies of Copper on peat soils indicate feasible solutions.

Few isolated green fields of late canola were sprayed for bertha army worms in the Legal and Stony Plain areas.

Hot, dry weather in late July prematurely ripened crops but did not decrease yields which increased 5-8 percent. Combining started early only to be interrupted for 25 days in September by cool, wet weather until October 1st. Serious losses of yield, grade and germination resulted. Sprouting was found in a number of cereal fields throughout the region.

Early snowfall on October 16th ended harvest and any fertilizer and/or chemical application as temperatures dropped to -28°C by month end. Approximately 5 - 10% of seeded acres in the region were not harvested. Majority were in the northern areas with few local fields in each district.

Spring combining started the first week of May in the southern part of the region and tentatively the second week in the northern part of the region. Yields were less than 60% of fall crop and downgraded to #2 Feed or Sample grade. The reduction in fall work has put extra pressure on valuable spring seeding time. Approximately 40 to 50% of total fertilizer (granular and phosphates) is on the farm previous to seeding. This level created localized shortages of anhydrous ammonia for fertilizer dealers, only affect the lower-level producers.

The twelve Agricultural Service Boards in the region carried out a wide range of projects under budget constraints. These programs included soil conservation, weed control, summer tours of crop variety plots predator and beaver control.

Seed Cleaning Plants handled 3,588,843 bushels of seed through 10 plants this past 1983/84 year, virtually the same as previous year. The major change in plants was increased in seed treating, a 20% increase over previous year (total 64,102 bu), however less than 2% of total volume cleaned. The plans have been finalized for construction of the new Stony Plain Seed Cleaning Plant.

The 1984/85 extension season encompassed a wide variety of topics. One major crop production program involved the Canola Growers and Barley Growers Associations in a separate series of large farmer meetings. Numerous other local programs covered the aspects of fertilization, crop protection, peat soil management, horticulture and many others. The main approach was to allow producers new methods or opportunities to maximize net returns through production under the present economic conditions.

General Overview

The 1984 growing season can be summarized as a relatively poor one in regards to forage and special crops. Although starting out with optimism, the lack of good rainfall throughout the growing season resulted in pasture, hay production, and fababean and pea yields being below expected levels. The first cut hay was of excellent quality, however, due to the lack of rainfall. Early harvesting of fababeans, mid-August, resulted in good quality although yields were about 40-60% of normal. The drought period finally ended with good fall moisture, resulting in poorer than normal quality second cut hay being made. The final problem was the early snow fall, October 19-20th, resulting in some late fall pasture not being utilized. This resulted in a very long winter period, much longer than normal. Hay shortages, surpluses, prices, and the shortage of straw was the normal talk for the entire winter.

Specific Observations

A continued high interest in improved grazing management, rotational grazing, and various On-Farm-Demonstrations in the subject area resulted in many tours, seminars, and written articles. The Regional Pasture survey of 12 producers averaged a calculated stocking rate of approximately 3.2 A.U.M. per acre in 1984 which was four times greater than the average .8 A.U.M. per acre achieved by the three grazing reserves in the Region.

Continued interest in silage production information in 1984, although the dry summer again changed some producers minds. With the rainfall on second cut hay fields, greater interest shown in chemical hay preservations and stabilizers.

The special crops saw little overall expansion in interest and acreage in 1984. However, renewed interest in late fall resulted in the formation of the Northern Branch of the Pulse Association of Alberta in the Northwest Region out of Morinville to cover areas around Edmonton and North to Barrhead. Although the membership is relatively small, the interest will maintain at a keen level throughout 1985.

Both the West Central and Pembina Forage Associations continued to maintain a high producer interest in all activities. Both associations conducted a pasture project on grazed yearlings. Also, both Associations ended up the year with change of managers. This will result in some re-organization of activities and Director's input levels for the upcoming year. Pembina Forage Association is planning to develop a half section rotational grazing cow-calf project in 1985.

Extension activities including meetings, tours, written articles, and demonstrations remained at a very high level in 1984. Regional information as well as requests from other areas increased the work load for Associations, some producers, and staff. The interest remains especially keen in the pasture management topics as can be seen at meetings and written articles throughout Western Canada.

Although weather affected yield of hay and pasture and quality of second cut stands, the Region had a large surplus of hay for sale. Although much moved out of the Region into Southern Alberta, April hay listings still show a slight unsold surplus which will be carried over into 1985 winter.

Due to the long winter of 1984/85, winter injury has shown up in legume stands as well as some fall rye fields. The extent of the injury is limited to a general reduction in vigour, up to 20% reduction in plant numbers, and serious winter kill in a few older alfalfa stands, second and third year clover stands, and to the odd seedling stand.

With the high acreage of seed forage in the Region coupled with no winter injury since 1981, the reduction of total quantity of forage for the Region will not be significantly affected by the plowing down of older fields after first cut.

Forage seed yield varied tremendously due to lack of or timely rainfall. The dry, hot summer resulted in excellent pollination of both alfalfa and clover stands. Some legume seed acreage was snowed under and not harvested in 1984. The lack of suitable seed prices to the

producer will result in a projected decrease in forage seed acreage and interest in forage seed in 1985.

Producer Concerns

1. Production input costs are of prime concern to all producers. This is especially true in the hay and pasture acreages in the Region. Although producers can justify reasonable fertility and weed control in cereals and canola, elimination of these inputs in hay and pasture acreage is becoming more common. This will result in lower production of forage throughout the Region.

2. Concern by some producers regarding the tremendous publicity of the 1984 Drought and Feed shortage. Some feel that this was over done in that producers in the area still have feed for sale but there are no buyers.

REGION SIX - FAIRVIEW

The 1984 crop year was a difficult one for every farm producer though the final crop yields were at least satisfactory for most.

Two weeks of what is usually optimum planting time, (May 15-31) was lost due to heavy rainfall and seeding was extended to June 15 with some as late as June 30th.

At the season's end, virtually none of the grain was threshed dry and the October 16th snowfall terminated the season with approximately 25% of the crop unharvested.

1984 was one of the few occasions that major crop kinds were in equal distribution with 900,000 acres each of wheat, barley and canola. Fallow and forage acres were 600,000 each. Wheat graded mainly #3 red with some #2 red from fall threshed and utility from spring 1985 harvest. Almost all barley graded #1 feed but a larger than usual volume was accepted for malt.

Spring threshed barley graded #2 and 3 feed with in some cases considerable grade losses and in some areas heavy yield losses from overwintering. Canola grades were lower than usual with all grades except sample experienced in fall threshed and sample included in spring threshed canola. Spring harvest of the canola acreage of this magnitude was the first ever for the Peace; 200,000 acres estimated. Recovery was much better than expected both for yield and grade.

Forage grass seed harvest was completed with fescue yield estimated better than average (350 lbs), bromegrass lower (250 lbs/acre) and timothy better than average 300 lbs/acre.

Forage legume harvest was either difficult or impossible in the fall and consequently about 50% was spring threshed. Seed yields were below average.

An excellent hay crop was harvested however and in premium condition. With the extreme feed shortage in Southern Alberta an estimated surplus of 170,000 tons of Peace River hay was moved to fill the shortages.

Our seed use survey indicated high acceptance of the new barley varieties Johnson and Otal, Cascade oats and Katepawa wheat. Limited amounts of the new growth regulator Cerone was used on farms and proved its capability to shorten and strengthen straw.

High moisture conditions made good weed control possible for most herbicides both old and new though considerable acreages were accessible only to aerial application. Lontrel, Glean and Poast were used extensively for their particular applications and with good results.

Perennial weed control showed a significant improvement over preceding years.

Demonstrations and Trials

a) The Tangier flat pea failed to perform to expectations at Fairview in 1984. Forage yield was but half of 1983 and virtually no seed formed. Performance at Ft. Vermilion however remains optimistic.

b) Limited potash experimentations showed increasing potential for potash for both improving yields and straw strength.

c) An extensive cultural chemical thistle control research project was initiated at Eaglesham jointly with C.D.A. Beaverlodge to evaluate effectiveness of various combinations of tillage and herbicides for optimal control. Perennial weeds are our most singular threat and major cost factor to the continuous crop concept.

d) Red clover production for plowdown was monitored and was estimated at 250,000 acres of which the majority was successfully managed for plowdown. Some of the problematic areas will be dealt with in 1985.

Extension

Our activities in Extension featured commitments to both new needs as well as old in these areas:

1) Upgrading canola production for better yields.
2) Performance of cereal and oilseed varieties.
3) Perennial weed control seminars.
4) Wheat production meetings and a whet production survey was undertaken.
5) Clover plowdown.
6) Production of improved quality seed.

Seed Cleaning Plants

Municipal seed cleaning plants experienced another successful year financially. Plant inspectors indicated that we have reached a uniform high performance capability in terms of plant facilities and equipment, but a few plants need to strengthen the manager-operator capabilities.

Agriculture Service Boards

We have over the recent years developed the perception that the Agricultural Service Board membership now has attracted the foremost farm individuals who are provided unprecedented leadership for their local agricultural communities and to the provincial government. At the same instant the challenges to these Agricultural Service Boards are immense considering the multitude of technologies that need to be dealt with and the increasing numbers of farm issues and beaurocratic agencies that are involved.

V. RESEARCH PROJECTS

INVENTORY OF PLANT INDUSTRY RESEARCH PROJECTS - 1984

Projects	PMY	TMY
Cereals and Oilseeds	3.80	22.50
Forage Crops	1.90	1.50
Special Crops	1.75	3.25
Ornamentals, Trees and Shelterbelts	1.40	3.22
Fruit Crops	0.92	1.24
Vegetables and Potatoes	2.59	5.30
Food Processing	0.30	1.20
Greenhouse Crops	0.70	1.25
Soil Management - Fertilizers - Analysis	1.60	2.80
Weed Control	2.47	3.55
Apiculture	0.60	0.70
TOTALS	18.03	46.51

CEREALS AND OILSEEDS

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	1987	TMY
Feed Barley Breeding - to develop high yielding adapted varieties of feed grains with emphasis on protein content and quality	1 site Irrigation 1 site Area 1 1 site Area 2 1 site Area 3 4 sites Area 4 2 sites Area 5 1 site Saskatchewan	J. Helm D. Salmon F. Mederick	Field Crops ARC	Ongoing Reported Field Crops	1.25	11.25
Spring Triticale Breeding	1 site Irrigation 1 site Area 2 2 sites Area 3 3 sites Area 4 2 sites Saskatchewan	D. Salmon J. Helm F. Mederick	Field Crops	Ongoing		
Cereal & Oilseed Regional Variety Trials on barley, wheat, oats, flax and rapeseed	4 sites Area 1 3 sites Area 2 4 sites Area 3 6 sites Area 4 7 sites Area 5 5 sites Area 6 4 sites Irrigation	J. Helm D. Salmon B. Wolfe Z. Kondra D. McAndrew S. Kibite R. Gaudiel K. May	Field Crops Field Crops Ag. Canada U. of A. Ag. Canada Lacombe AHRC Ag. Canada	Ongoing. Reported Cereal & Oilseed Advisory Committee, Field Crops and Agricultural Research Council	0.30	8.00
Winter wheat and winter triticale breeding and agronomy	Brooks, Lacombe Lethbridge Olds, Trochu 3 sites Saskatchewan	J. Helm D. Salmon F. Mederick	Field Crops	Ongoing. Reported Field Crops and Alberta Research Council	1.00	2.20
Feed Grain Agronomy - silage production, crop rotation study and disease evaluation	Lacombe Olds	F. Mederick J. Helm D. Salmon	Field Crops	Ongoing		

CEREALS AND OILSEEDS (continued)

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Winter wheat cold hardiness study	Lacombe Edmonton	F. Mnderick J. Helm D. Salmon	FFF	Initiated 1983-84 Renewed 1984-85		
Screening seed treatment fungicides for efficacy against stem smut of fall rye and bunt of winter wheat	Lethbridge Brooks	B. Puchalski R. Howard	Ag. Canada AHRC	AHRC Annual Report 1984 ECPUA Pesticide Research Report 1984	0.10	0.20
Survey of damage by Lygus sp. infesting Canola	Province wide	R. Butts	Reg. Crops Lab Fairview	Complete Report available		
Insecticide foliar sprays for thrips in Barley	Fairview	R. Butts	Reg. Crops Lab Fairview	Ongoing. Will be reported in ECPUA Report 1985	0.10	0.10
Confinement trials for Lygus sp. in Canola	Fairview	R. Butts	Reg. Crops Lab Fairview	Ongoing	0.75	0.50
Control of leaf disease in barley with fungicide	4 sites in Westlock area	R. Carlyon B. Bjorge I. Evans L. Piening	Extension Crop Protection Crop Protection Ag. Canada	Initiated 1982 Ongoing	0.10	0.005
Improved disease forecast system for sclerotinia white mold in canola	Camrose/Barrhead	I. Evans P. Thomas M. Dolinski I. Parsons E. Zwanbag P. Kharbanda	Crop Protection Field Crops Field Crops Dupont May and Baker AEC, Vegreville	Initiated 1985	0.20	0.25

Forage Crops

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Annual forage crops for southern Alberta	Brooks	G. Riemer R. Gaudiel	FFF AHRC	Terminates March 30, 1986 AHRC Annual Report 1984 AHRC Pamphlet 83-6	1.05	0.40
Verticillium wilt of alfalfa	Brooks Lethbridge S. Alberta	R. Howard H. Huang G. Flores	AHRC Ag. Canada AEC, Vegreville	Disease surverys and ongoing trials. AHRC Annual Report 1984. Alberta Forage Advisory Committee. Plant Pathology Society of Alberta. Scientific Journals.	0.75	1.00
Silvertop in meadow foxtail assessment and control	Barrhead	R. Butts K. Lopetinsky	Reg. Crops Lab Field Services	Ongoing	0.1	0.1

Special Crops

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Agronomic Studies on Corn - Dryland Corn Study - Varietal trials	Seven Persons Bow Island Burdett, Scandia Warner, Lethbridge	Blair Roth Dave Major	Field Services Ag. Canada	Ongoing. Reported to ACC, Corn Binder, and SCAC	0.15	0.30
Agronomic Studies on Sunflowers - Varieties - Weed Control, Insect Control	Bow Island	Blair Roth H. Huang R. Gaudiel	Field Services Ag. Canada AHRC	Year 4. Reported to SCAC, Sunflower School, and Alta. Sunflower Seeds	0.15	0.30
Effects of Canopy Structure and Population on Sclerotinia Head Rot of Sunflowers	Bow Island	Blair Roth H. Huang R. Gaudiel	Field Services Ag. Canada AHRC	Year 2 of Disease project. Reported to SCAC, Sunflower School		
Proper Inoculation of Pulse Crops	Bow Island Grassy Lake Cranford Claresholm	Blair Roth R. Rennie	Field Services Ag. Canada Lethbridge Pulse Growers Assn. of Alta.	Year 3. Reported to SCAC, PGAA, Seminars NuKrop News, and various Farm Seminars	0.15	0.30
Safflower Viability Study	Warner, Wrentham Carmangay, Oyen Nobleford, Foremost	Blair Roth H.H. Muendel	Field Services Ag. Canada	Year 2. Reported to SCAC Dryland Salinity Seminar	0.15	0.20
Field bean cultivar and cultural trials	Brooks Bow Island Standard	R. Gaudiel	AHRC	Active. AHRC Annual Report 1984 Alberta Pulse Committee 1984 Expert committee	0.20	0.35

SPECIAL CROPS (continued)

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	IMY
New crop cultivar, cultural and adaptation trials	Brooks Bow Island Standard Acadia Valley	R. Gaudiel	AHRC	Active AHRC Annual Report 1984 Special Crops Committee 1984 Pulse Crops Committee 1984 Expert Committee 1984 Growers Meetings 1984	0.40	0.60
Herbs and spices cultural and adaptability	Brooks	R. Gaudiel	AHRC	Active AHRC Annual Report 1984 Growers Seminar	0.05	0.05
Corn and sorgnum cultivar and cultural	Brooks Bow Island Standard	R. Gaudiel	AHRC	Active AHRC Annual Report 1984 Alberta Corn Committee 1984	0.20	0.10
Screening fungicides for efficacy against Sclerotinia white mold on dry beans	Brooks Bow Island	R. Howard	AHRC	Completed AHRC Annual Report 1984 Alta. Pulse Crop Adv. Com. ECPUA Pesticide Research Report 1984	0.05	0.05
Effect of Soil Loosening on Root Rot and Yields of Pulse Crops	Brooks Various locations in s. Alberta	R. Howard R. Gaudiel R. C. McKenzie	AHRC AHRC Irrig. & Cons.	Ongoing AHRC Annual Report 1984 Alta. Pulse Crop Adv. Com. AHRC Pamphlet 85-10	0.25	1.0

Ornamentals, Trees and Shelterbelts

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Woody ornamentals	Brooks	B. Casement	AHRC WCSH PFRA Nurseries Ag. Canada Morden	Active. Report to WCSH AHRC Annual Report 1984 AHRC Summary Report 85-3	0.34	1.00
Annual and perennial flowers	Brooks	B. Casement	AHRC All America Selections	Active. Report to AAS and Seed Companies AHRC Summary Report 85-4 AHRC Annual Report 1984	0.21	0.65
Nursery production of woody ornamentals	Brooks	B. Casement	AHRC	Active AHRC Annual Report 1984	0.30	0.70
Overwintering trials of containerized nursery stock	Edmonton	H. Oosterhuis C. McIsaac F. Straka	ATN & HC	Ongoing	0.10	0.15
Monitoring of transplanted container grown evergreens	Edmonton	H. Oosterhuis F. Straka	ATN & HC	Ongoing	0.05	0.10
Germination testing of hawthorn seeds	Edmonton	H. Oosterhuis A. Straka	ATN & HC	Completed	0.05	0.05
Seed propagation testing native species INV 30	Edmonton	G. Grainger P. King	ATN & HC ENR	Ongoing	0.10	0.20

ORNAMENTALS, TREES AND SHELTERBELTS (continued)

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Container stock media test INV 28	Edmonton	G. Grainger	ATN & HC	Completed		
Container vs. Bareroot Evaluation INV 42	Edmonton Brooks	G. Grainger B. Casement H. Oosterhuis	ATN & HC AHRC ATN & HC	Active	0.05	0.05
Seed Evaluation INV 47	Oliver	G. Grainger	ATN & HC	Completed	0.05	0.05
Handling and storage of nursery stocks	Brooks, Edmonton Lacombe, Coaldale Strathmore	T. Krahn	AHRC	Completed AHRC Annual Report 1984		
Screening poplar cultivars for resistance to winter injury and bud-gall mites	Brooks	R. Howard B. Casement	AHRC	Active	0.01	0.02
Regional woody plant hardiness test program	Various Alta. Sites	LANTA Growers B. Casement H. Oosterhuis G. Grainger	LANTA AHRC ATN & HC	Active	0.15	0.25

Fruit Crops

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Bush and native fruit culture and cultivar improvement	Brooks Edmonton	S. Mahadeva G. Grainger	AHRC ATN & HC	Active AHRC Annual Report 1984 AHRC Pamphlet 85-8	0.25	0.40
Tree fruit culture and cultivar improvement	31 locations in province (Test Orchards)	S. Mahadeva	AHRC	Tree fruit research inactive AHRC Annual Report 1984 AHRC Pamphlets 85-7	0.02	
Native fruit pilot project	Sexsmith Manning Fairview	S. Mahadeva J. Davidson	AHRC Ag. Canada Beaverlodge	Active	0.18	
Small fruit culture and cultivar improvement	Brooks	S. Mahadeva	AHRC	Active AHRC Annual Report 1984 AHRC Pamphlet 85-7	0.25	0.60
Processing and quality evaluation of fruits	Brooks	T. Smyrl S. Mahadeva	AHRC	Active	0.02	0.04
Native fruit utilization	Brooks	T. Smyrl	AHRC	Active	0.20	0.20

VEGETABLES AND POTATOES

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Bulb crops cultural and cultivar project	Brooks	P. Ragan	AHRC	AHRC Annual Report 1984 AHRC Pamphlet 85-1, 85-2	0.20	0.30
Cole crop cultural and cultivar project	Brooks	P. Ragan	AHRC	AHRC Annual Report 1984 AHRC Pamphlet 85-1, 85-2	0.20	0.25
Pea and bean cultural and cultivar project	Brooks	P. Ragan	AHRC	AHRC Annual Report 1984 AHRC Pamphlet 85-1, 85-2	0.25	0.25
Sweet corn cultural and cultivar project	Brooks	P. Ragan	AHRC	AHRC Annual Report 1984 AHRC Pamphlet 85-1, 85-2	0.05	0.05
Root crop cultural and cultivar project	Brooks	P. Ragan	AHRC	AHRC Annual Report 1984 AHRC Pamphlet 85-1, 85-2	0.02	0.05
Solanaceous vegetable cultural and cultivar project	Brooks	L. Hausher P. Ragan	AHRC	AHRC Annual Report 1984 AHRC Pamphlet 85-1, 85-2	0.01	0.20
Vegetable mulch and tunnel project	Brooks	L. Hausher	AHRC	AHRC Annual Report 1984 AHRC Pamphlet 85-1, 85-2	0.25	0.40
Vine crop cultivar and cultural project	Brooks	L. Hausher	AHRC	AHRC Annual Report 1984 AHRC Pamphlet 85-1, 85-2	0.15	0.40
Perennial vegetable cultivar and cultural project	Brooks	L. Hausher	AHRC	AHRC Annual Report 1984 AHRC Pamphlet 85-2	0.01	0.10
Handling and storage of vegetables	Brooks	T. Krahn	AHRC	AHRC Annual Report 1984	0.10	0.15

VEGETABLES AND POTATOES (continued)

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Processing and quality evaluation of vegetables	Brooks	T. Smyrl	AHRC	Active	0.10	0.15
Chemical aspects of carrots in storage	Brooks	T. Smyrl T. Krahn	AHRC	Inactive		
Potato cultivar improvement	Brooks Various Locations	C. Schaupmeyer R. Howard T. Smyrl D. Lynch	AHRC Ag. Canada	Active. Several types of trials AHRC Annual Report 1984 1984 Progres Report to Prairie Regional Potato Trial Group. National Potato Breeding Report 1983 (U.S.A.)	0.60	1.40
Potato production research	Brooks	C. Schaupmeyer	AHRC	Active AHRC Annual Report 1984 AHRC Pamphlet 85-10	0.40	1.00
Handling and storage of potatoes	Brooks	T. Krahn	AHRC	Inactive		
Potato processing parameters	Brooks	T. Smyrl	AHRC	Completed	0.05	0.20
Screening potato cultivars for resistance to Early Blight	Brooks	R. Howard D. Lynch	AHRC Ag. Canada	Ongoing AHRC Annual Report 1984	0.05	0.05

VEGETABLES AND POTATOES (continued)

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Susceptibility of commonly grown potato cultivars to bacterial ring rot	ATN & HC Vancouver	S. DeBoer I. Evans J. Stenrue	Ag. Canada Crop Protection	Ongoing Reported to Alberta Potato Growers Annual Meeting	0.10	0.30
Eumartii wilt of potatoes	ATN & HC	S-F. Huang I. R. Evans J. Stenrue	Ag. Canada Crop Protection	Ongoing. Initiated 1984. Paper. Canadian Plant Crop Protection Disea	0.05	0.05

Food Processing

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Reducing sugar decomposition during dehydration	Brooks	T. Smyrl	AHRC	Active	0.10	0.30
Monitoring processing by x-rays	Brooks	T. Smyrl	AHRC	Active	0.10	0.30
Sugar beet storage	Taber Brooks	P. Bergen T. Smyrl	Sugar Beet Co. AHRC	Active	0.10	0.60

GREENHOUSE CROPS

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Culture of greenhouse vegetable crops	Brooks	M. Mohyuddin	AHRC	Active	0.25	0.50
Culture of greenhouse floriculture and foliage crops	Brooks	M. Mohyuddin	AHRC	Active	0.10	0.20
Evaluation of hydroponic systems for growing greenhouse crops	Brooks	M. Mohyuddin	AHRC	Active	0.10	0.20
Diseases of greenhouse crops	Brooks	R. Howard M. Mohyuddin	AHRC	Ongoing and new trials AHRC Annual Report 1984	0.05	0.25
Evaluation of chemical and biological agents to control greenhouse whiteflies and thrips	Brooks Redcliff Medicine Hat	M. Mohyuddin U. Soehngen M. Steiner	AHRC AHRC AEC	Ongoing and new trials Alta. Greenhouse Newsletter AHRC Annual Report 1984	0.20	0.10

Soil Management - Fertilizers - Analysis

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Assessment of deep plowing, ripping and ammendment of applications as a method of improving solonetzic soils	39 locations	J. Lickacz J. Carson	Soils Branch Soils Branch	Initiated 1978 Continued in 1985	0.50	0.50
Fertilizer requirements of irrigated grains and oilseeds	14 locations	R.H. McKenzie	Soils Branch	Ongoing	0.30	0.80
Fertilizer requirements of dryland crops	7 location	R.H. McKenzie	Soils Branch	Ongoing	0.20	0.40
Fertilizer requirements of irrigated special crops	10 locations	R.H. McKenzie Refe Gaudiel	Soils Branch AHRC	Ongoing	0.20	0.40
Crop response to liming and ripping of luvisolic soils	2 locations	J. Lickacz D. Penney	Soils Branch Soils Branch	Initiates 1985	0.05	0.05
Fertilizer response and soil test calibration for barley and canola	8 locations	D. Penney	Soils Branch	1984-87	0.15	0.30
Response of barley to residual K	3 locations	D. Penney J.A. Robertson	Soils Branch U. of A.	1984-87	0.10	0.15
Soil acidity and liming (lime x fertilizer x ripping)	4 locations	D. Penney J. Lickacz	Soils Branch Soils Branch	1984-87	0.10	0.20

Weed Control

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Herbicide trials and evaluations INV 39	Oliver	G. Grainger	ATN & HC	Complete File * INV 37,38,40		
Weed control in pulses	Brooks Bow Island	R. Esau	AHRC	Active AHRC Annual Report 1984 Expert Committee on Weeds	0.25	0.25
Weed control in coniferous transplants	Edmonton	H. Oosterhuis	ATN & HC	Ongoing	0.05	0.10
Chemical weed control for nursery crops and shelterbelts	Brooks	R. Esau	AHRC	Active AHRC Annual Report 1984 Expert Committee on Weeds Can. Hort. Council	0.20	0.15
Chemical weed control in small and native fruit	Brooks	R. Esau	AHRC	Active AHRC Annual Report 1984 Expert Committee on Weeds	0.02	0.02
Weed control in vegetable crops	Brooks	R. Esau	AHRC	Active AHRC Annual Report 1984 Expert Committee on Weeds Can. Hort. Council	0.25	0.28
Weed control in potatoes	Brooks	R. Esau	AHRC	Active AHRC Annual Report 1984 Expert Committee on Weeds Can. Hort. Council	0.20	0.23
Herbicide residues in crop rotation	Brooks	R. Esau	AHRC FFF	AHRC Annual Report 1984 Expert Committee on Weeds	0.08	0.07

WEED CONTROL (continued)

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Weed control trial and demonstration opportunities	Province-wide	D. Maurice D. Cole	Crop Protection Branch	Ongoing	0.40	0.50
The effect of herbicides on several forage species	Barrhead	D. Maurice J. Moyer L. Darwent	Crop Protection Branch Ag. Canada	Completed	0.20	0.40
Herbicide screening trial for knotweed control	Oyen Delia Castor	D. Maurice D. Cole	Crop Protection Branch	Ongoing Annual Reports to Expert Committee on Weeds	0.10	0.25
Roadside weed control	Province-wide	D. Maurice T. Footz	Crop Protection Branch	Completed	0.10	0.10
Equipment evaluation	Province-wide	D. Maurice T. Footz E. Wiens	Crop Protection Branch PAMI	Initiated 1984	0.10	0.15
Herbicide screening trial and cultural control of tall buttercup in pasture	Foothills	D. Maurice D. Cole	Crop Protection Branch	Initiated 1983 Continued	0.10	0.25
Control of blueweed in pasture	Pincher Creek	D. Maurice D. Cole	Crop Protection Branch	Completed	0.10	0.25
Development of reclamation techniques for soil treated with residual herbicides	Tofield	D. Maurice	Crop Protection Branch IVMAA	Initiated 1983 Continued	0.10	0.25

WEED CONTROL (continued)

PROJECT TITLE	TRIAL LOCATIONS	RESEARCHERS	AGENCY	STATUS AND REPORTED	FMY	TMY
Control of brush using aerially applied picloram and dicumba	6 locations in province	W.A. Stearman	Crop Protection	Initiated 1979 Branch on brush control, soil residues, grass recovery	0.005 In 1985 continue obse	
Brush control and pasture renovation	M.D. of Bonnyville	W.A. Stearman	Crop Protection Branch	Initiated 1975-76 Continue observations on maintenance of brush control under light and heavy grazing pressure	0.005	
Brush control and pasture renovation	County of Athabasca	W.A. Stearman	Crop Protection Branch	Initiated 1978 Continue observation on brush regrowth.	0.005	
Control of scentless chamomile in creal	Nanao	D. Maurice	Crop Protection Branch	Initiated 1985	0.10	0.10
Control of tansy on roadsides	Smoky Lake	D. Muarice	Crop Protection Branch	Initiated 1985	0.05	0.10
Suppression of Toadflax in cereal crops	Three Hills	D. Muarice	Crop Protection Branch	Initiated 1984	0.05	0.10

APICULTURE/ENTOMOLOGY

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Honeybee management	Brooks Scandia	U. Soehngen	AHRC	Completed AHRC Annual Report 1984	No further Commitment	
Alfalfa leafcutter management	Brooks	U. Soehngen	AHRC	Active AHRC Annual Report 1984	0.05	0.05
Control of insects in greenhouse crops	Redcliff Medicine Hat	U. Soehngen	AHRC	Active AHRC Annual Report 1984	0.15	0.15
Control of corn insects	Redcliff Medicine Hat	U. Soehngen	AHRC	Active AHRC Annual Report 1984	0.40	0.40

VI. PUBLICATIONS

A. FIELD CROPS BRANCH

BULLETINS AND FACTSHEETS

- Varieties of Perennial Hay and Pasture Crops for Alberta, Agdex 120/32
- Varieties of Annual Forage Crops for Alberta, Agdex 120/32-1
- Varieties of Cereal and Oilseed Crops for Alberta, Agdex 100/32

PUBLICATIONS

- Soft White Wheat Production, Agdex 112/20-2
- Canola Production Manual, for Canola Council of Canada
- Canola Production in Alberta, Agdex 149/20-1
- High Moisture Grain Production Research

NEWSLETTERS

- Forage Seed Notes, prepared by Forage Seed Council
- Quarterly newsletter for the Alberta Alfalfa Seed Producers Association

B. CROP PROTECTION BRANCH

PUBLICATIONS

- Guide to Crop Protection in Alberta - Part I - Chemical, Agdex 606-1
- Guide to Crop Protection in Alberta - Part I - Chemical (Staff use only)
- Guide to Crop Protection in Alberta - Part I - Identification (Staff use only)
- Canola Grower's Manual - in co-operation with Field Crops Branch
- Backyard Pest Management - Adgex 605-2
- Major Diseases of Turfgrass in Western Canada - Agdex 273/636-3
- Diseases of Alfalfa and Diseases of Clover in Diseases of Field Crops in Canada by The Canadian Phytopathological Society
- Weeds of Alberta - Agdex 640-4 - reprinting jointly with Alberta Environmental Centre
- Seed Potato Production Manual (limited distribution)

FACTSHEETS

- Fireblight, 1985 - Agdex 636-1
- Seed Potato Production - Agdex 258/13-1

COUNTRY GUIDE INSERTS

- Restricted and Perennial Weeds in Alberta - Agdex 641-12
- Developing and Maintaining Brush Pastures - Agdex 643-1
- Continuous Cropping - Agdex 516-2
- Control of Pocket Gophers and Ground Squirrels - Agdex 684-1

EXPERT COMMITTEE ON WEEDS RESEARCH REPORTS
Western Canada Section Dec 3-6, 1984, Winnipeg, Manitoba

Prostrate Knotweed Control in Wheat, Maurice, D.C., Cole, D.E. 1984. ECW Res. Rep. West. Sect. Vol. 2 p. 715. Expt. No. 8421362

Prostrate Knotweed Control in Wheat, Maurice, D.C., Cole, D.E. 1984. ECW Res. Rep. West. Sect. Vol. 2 p. 715. Expt. No. 8421363.

Prostrate Knotweed Control in Wheat, Maurice, D.C., Cole, D.E. 1984. ECW Res. Rep. West. Sect. Vol. 2 p. 717. Expt. No. 8421361.

Tolerance of Seedling Legume to Herbicides for Broad-leaved Weed Control, Maurice, D.C., Cole, D.E., 1984. ECW Res. Rep. West. Sect. Vol. 3 p. 10.

Tolerance of Seedling Legumes to Herbicides for Broad-leaved Weed Control, Maurice, D.C., Cole, D.E. 1984. ECW Res. Rep. West. Sect. Vol. 3 p. 9.

Tolerance of Seedling Grasses to Herbicides for Broad-leaved Weed Control, Maurice, D.C., Cole, D.E. 1984. ECW Res. Rep. West. Sect. Vol. 3 p. 71.

Suppression of Toadflax in Barley, Maurice, D.C., Cole D.E. 1984. ECW Res. Rep West. Sect. Vol. 3 p. 161.

Tall Buttercup Control in Established Pasture, Maurice, D.C., Cole D.E. 1984. ECW Res. Rep. West. Sect. Vol. 3 p. 162. (Rocky Mountain House)

Tall Buttercup Control in Established Pasture, Maurice, D.C., Cole, D.E. 1984. ECW Res. Rep. West. Sect. Vol. 3 p. 163. (Rimbey)

Tall Buttercup Control in Established Pasture, Maurice, D.C., Cole, D.E. 1984. ECW Res. Rep. West. Sect. Vol. 3 p. 164. (Edson)

Tall Buttercup Control in Established Pasture, Maurice D.C., Cole, D.E. 1984. ECW Res. Rep. West. Sect. Vol. 3 p. 165. (Pincher Creek)

Tall Buttercup Control in Established Pasture, Maurice, D.C., Cole, D.E. 1984. ECW Res. Rep. West. Sect. Vol. 3 p. 155. (Eckville)

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Annual Broadleaf Weed Control in Wheat with TeeJet Flat Fan nozzles at Various Water Volumes, Yarish, W., Wiens, E.H., Maurice, D.C. 1984. ECW Res. Rep. West. Sect. Vol. 3 p. 214.

Annual Broadleaf Weed Control in Wheat with the Computerspray Field Sprayer, Yarish, W. Wiens, E.H., Maurice, D.C. 1984. ECW Res. Rep. West. Sect. Vol. 3 p. 215.

Annual Broadleaf Weed Control in Wheat with the Controlled Droplet Applicator, Maurice, D.C, Yarish, W., Wiens, E.H. 1984. ECW Res. Rep. West. Sect. Vol. 3 p. 216.

Annual Broadleaf Control in Wheat with the Sprafoil Spray System. Maurice, D.C., Yarish, W., Wiens, E.H. 1984. ECW Res. Rep. West. Sect. Vol. 3 p. 217.

Roy L.D. and M.J. Dorrance, 1985. Coyote movements, habitat use, and vulnerability in central Alberta. J. Wildl. Manage. 49(2): 307-313.

Chukwudebe, A.C., M.A. Hussain and P.C. Oloffs. 1984. Hydrolytic and metabolic products of acephate in water and mouse liver. J. Environ. Sci. Health. B19(6), 501-522.

Hussain, M.A., R.B. Mohabad and P.C. Oloffs. 1984. Toxicity and metabolism of acephate in adult and larval insects. J. Environ. Sci. Health. B19(3), 355-377.

Thompson, Gill, R., P.M. Thomas and I.R. Evans. 1984. Efficacy of aerial application of benomul and iprodione for the control of sclerotinia stem rot of canola (rapeseed) in central Alberta. Can. J. Plant Pathol. 6: 75-77, 1984.

S.F. Hwang and I.R. Evans. 1985. Eumartii Wilt of Potato in Alberta. Can. Plant. Dis. Surv. in press.

P. Ellis, C. Louie and I.R. Evans. 1984. Efficacy of Seed Treatment Fungicides and Cancote for Control of the Seedling Disease Complex of Canola. Canadian Pesticide Research Report.

P. Ellis, C. Louie and I.R. Evans. 1984. Effect of Seed Treatments on Emergence of Canola. Canadian Pesticide Research Report.

P. Ellis, C. Louie and I.R. Evans. 1984. Effect of Seed Treatments on Emergence of True Loose Smut and Common Root Rot of Barley. Canadian Pesticide Research Report.

P. Ellis, C. Louie and I.R. Evans. 1984. Effect of Seed Treatments on Emergence, Common Root Rot and Yield of Barley. Canadian Pesticide Research Report.

SLIDE KITS

- Seed Treatment of Cereals and Oilseeds
- Diseases of Canola
- Insect Pests of Canola

FILMS

- Canola Production on the Prairies - in co-operation with Field Crops Branch

POSTERS

- Seedling Blight/Flea Beetles Blackleg

C. SOILS BRANCH

Papers and Other Publications

Making the Most of Nitrogen - Recommended Practices Resulting from Recent Research in Alberta. Penney, D.C. Presented at 28th Annual Manitoba Soc. of Soil Sci. Meeting, January 1985.

Recent Potassium Fertilizer Research in Alberta. Robertson, J.A., Penney, D.C. and R.J. Labbe. Presented at Alberta Soil Sci. Workshop February 1985.

Solonetzic Soils - County of Paintearth prepared by J. Lickacz, B. Hansen, M. Klaas and J. Howe.

Fertilizer Application Equipment. Agdex 542-6, R.H. MacKenzie.

Fertilizers, Their Properties, Methods of Storage and Handling. Agdex 545-5, R.H. McKenzie.

Near Infrared Reflectance Spectroscopy (NIR) Research Development Report. Redshaw, E.S. Presented at the 5th Annual NIR Forage Research Network Workshop. March 7-8, 1985. Maryland, U.S.A.

Computer Assisted Summarization of the Spatial Distribution of Soil Fertility Factors for Alberta. Kryzanowski, L.M. and D.H. Laverty. Presented at the 22nd Alberta Soil Science Workshop, Lethbridge, Alberta, February, 1985.

Fall and Spring Sampling for Mineral N in North-Central Alberta. Malhi, S.S., M. Nyborg, R. Walker, and D.H. Laverty. Canadian Journal of Soil Science. In Press.

Area Estimates of Major Soil Fertility Factors for Alberta. Laverty, D.H. and L.M. Kryzanowski. Alberta Agriculture, Soils Branch.

FACTSHEETS

- Applying Fertilizer Effectively. Agdex 542-7, D.C. Penney
- Potassium Fertilizer Application in Crop Production. Agdex 542-9, D.C. Penney

D. ALBERTA TREE NURSERY AND HORTICULTURE CENTRE

PUBLICATIONS

- Diederichs, Marie. Nitrogen Fertilizers for Turfgrass. Prairie Magazine. Vol. 7, No. 4. 1984
- Grainger, George. Evaluating Trees and Shrubs in Alberta. Revised. Agdex 275/33-2
- Taylor, Lorraine. Current Turf Research in Canada. Turf Line News. 1984
- Vladicka, Betty. Vegetables Without a Garden. Prairie Gardener. 1984
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- Nursery Trials, 1984
- Turf Trials, 1984
- Co-operative College and University Vegetable Cultivar Trials, 1984
- Vegetable Cultural and Cultivar Trials, 1984

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- Turf Notes - Editor: Lorraine Taylor
- Produce Notes - Editor: Phil Dixon
- Nursery Notes - Editor: Betty Vladicka
- Alberta Horticulturist - Editor: Betty Vladicka
- Hort Happenings - Editor: Betty Vladicka
- Horticulture Extension Notes - Editors: Lorraine Taylor/Leonard Eckberg

E. A.H.R.C.

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ABSTRACTS

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- Spent media for bedding plants. E.B. Casement
- Weed control in nursery stock. R. Esau
- Weed control in nursery containers. R. Esau
- Fall and spring herbicidal treatments for 'Tower' poplar. R. Esau
- Weed control in carrots. R. Esau
- Zinc deficiency of drybeans in Alberta. R. Gaudiel
- Sensitivity of drybean varieties to zinc deficiency. R. Gaudiel
- Yield of sixteen cultivars and selections of asparagus over a three year period. L. Hausher
- Yield responses of 'Early California Wonder' green pepper to polyethylene mulch and tunnels (over a three year period). L. Hausher
- Head smut of corn in Alberta. R. Howard
- Corky ring spot of potatoes. R. Howard
- Effect of ethrel on ripening saskatoons in the Peace River region of Alberta. S. Mahadeva
- Evaluation of tomato cultivars on rockwool. M. Mohyuddin
- Effect of substrate temperature on the yield of seedless cucumbers. M. Mohyuddin
- Comparison of the sucrose rating parameter and the fructose-glucose ratio when measured at harvest in predicting storability of potatoes for processing. T. Smyrl
- Use of radiography to follow moisture profiles during the dehydration and rehydration of vegetables. T. Smyrl
- The European corn borer in Alberta. U. Soehngen
- European corn borer control with aerial application of Ambush 1-G. U. Soehngen
- European corn borer control in silage corn. U. Soehngen

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- Postemergence oxyfluorfen for weed control in onions
- Postemergence tank mixtures for onions
- Pendimethalin for weed control in onions
- Tolerance of potato cultivars to metribuzin
- Pre-emergence weed control in potatoes
- Postemergence herbicides for grass control in cabbage, cauliflower, rutabagas, carrots and onions

- Weed control in lentils
- Postemergence weed control in dry beans
- Pre-emergence weed control in dry beans
- Tolerance of bean cultivars to PP021
- Fall and spring herbicidal treatments for 'Tower' poplar
- Weed control in established 'Smoky' saskatoons
- Weed control in established saskatoons
- Saskatoons for residue analysis
- Weed control in nursery containers
- Weed control in 'Northwest' poplars
- Weed control in Mountain Ash
- Effects of chlorsulfuron on succeeding rotation crops - 81
- Effects of chlorsulfuron on succeeding rotation crops - 82
- Herbicides for pumpkin - 1983 trial
- Postemergence herbicides for grass control in cabbage, cauliflower, rutabagas and carrots - 1983 trial

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- Fungicide/adjuvant trials for the control of white mold on dry beans, 1984. R.J. Howard and E.R. Moskaluk
- Evaluation of seed treatment fungicides in controlling seed - and soil-borne bunt of winter wheat, 1984. B.J. Puchalski, F.R. Harper and R.J. Howard
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- Casement, E.B. 1983. Annual Flower Trials. AHRC Pamphlet 85-4
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Hausher, L. 1984. 'Vegetable Marketing in Alberta', 'Vegetable Varieties and Culture', 'Early Crop Production', 'Alberta Strawberry and Raspberry Production'. Market Garden Short Courses, Red Deer and Fairview.

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VII. PLANT INDUSTRY DIVISION STAFF LIST

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Head, Plant and Animal Feed Section	Dr. Edward Redshaw
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Research Horticulturist - Greenhouse Crops	Dr. Mirza Mohyuddin (to February 1, 1985)
Research Horticulturist - Greenhouse Energy Use	Mr. Clive Schaupmeyer (to July 31, 1984)
Research Hortiuclturist - Potatoes	Mr. Clive Schaupmeyer (from August 1, 1984)

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Region 2 - Airdrie	Mr. L.J. Welsh
Region 3 - Red Deer	Mr. W. Jackson
Region 4 - Vermilion	Mr. E.L. Treffrey
Region 5 - Barrhead	Mr. W. Chapman
Region 6 - Fairview	Mr. M. Rudakewich